

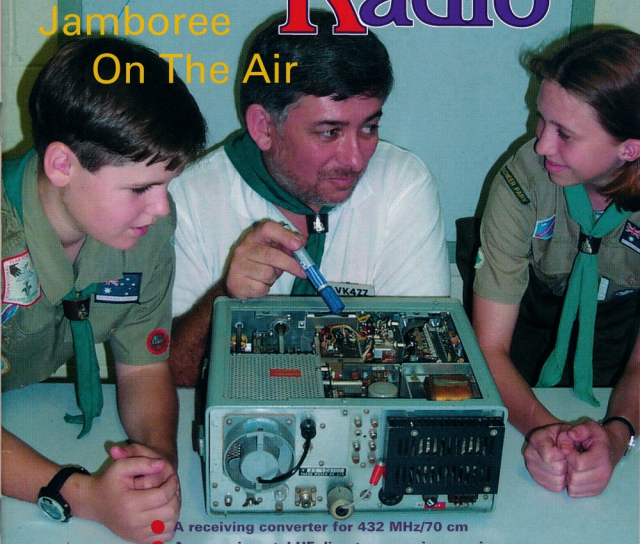
October 2001  
Volume 69 No 10



EARTH

# Amateur Radio

## Jamboree On The Air



- A receiving converter for 432 MHz/70 cm
- An experimental HF direct conversion receiver
- Modification of D4825 6m half wave vertical for 50.110 MHz
- Recycling mobile phone hands-free microphone/earpiece
- VI5RAS Special Event Station



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Australian  
Amateur Radio

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# Amateur Radio

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### Our cover this month

It always helps to explain some of the  
technology during a JOTA activity.

Gavin VK4ZZ explains the transceiver  
to Scouts.

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### Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the Federal Office on receipt of a stamped self-addressed envelope.

### Back Issues

Back issues are available directly from the WIA Federal Office (until stocks are exhausted), at \$4.00 each (including postage within Australia) to members.

### Photostat copies

When back issues are no longer available, photocopies of articles are available to members at \$2.50 each (plus an additional \$2 for each additional issue in which the article appears).

### Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

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A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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## Editorial

Colwyn Low VK5UE

## Shock and horror

As the AR Publications Committee meeting drew to a close on Tuesday 11<sup>th</sup> September the world changed.

In the matter of about 2 hours some six and a half thousand people died in ways that shocked us all. Into the nightmare rushed the emergency crews and a large number of these crews perished. Amateur Emergency Networks activated and some of them were in the centre of the destruction zone. They all stood firm and did what was required of them.

The WIA response to this tragedy is given elsewhere in this issue. One of the lessons that came out of these events is that a nation can never be too well prepared and complacency can lead to disaster.

We as Amateurs always rise to the occasion in times of emergency and provide first up communications. This one of the best reasons we can put to Government when we fight to keep our frequency allocations and keep any fees we pay minimal.

However this brings with it the need to be able to put a competent emergency force in the field at short notice, a group that has trained and knows the local region. Knows where to put the portable repeater and has the charged batteries on hand to run it.

This group is WICEN and we all have an obligation to know something of its operations and who are its active members. We can even help them out every now and again when they are mounting an exercise to help a local

organisation and get some practice in the field.

The Field Day Contests are another activity that helps prepare us for emergencies. JOTA, if we go away from the home QTH is another learning situation. I know from experience that 20km from home on a Field Day is not the time to find the microphone is home on the bench.

### October

JOTA and the Oceania Contest are upon us. If you missed the SSB Section then there is still the CW. The Spring and Summer VHF/UHF Field Days are in November and January see the CONTEST Column.

I see the WebMaster is proposing an email diversion service for all Australian Amateurs. I consider this is one way to establish contacts with non members and to provide a useful service to members who have to change ISP. There are more in depth services available to members. I have already heard that this has caused some members concern. However it is certainly an avenue to showing the Australian Amateur population that the WIA is willing to do something for all Amateurs. I look forward to some OTU letters but please keep them to 200 words.

That's all for this month. Let us continue to look at the big picture and not get lost in the minute details.

73 Colwyn VK5UE

## Useful info

**HSC Part 8 - Rotor-EZ Review** is a beauty, and reviews the concept of computerising your antenna rotor". Watch for the November AR

**FYI - IRLP Node Addresses and Status**

<http://status.irlp.net/static.html> <http://www.ipass.net/~jimprice/irlp/>  
John Alcorn VK2JWA SARC



## The WIA

## Advancing Amateur Radio



# It's *not* the end of the world! It's time for new ideas

By now some of you will have already had a chance to visit the new look WIA web page and seen that Joe Burford has done a great job of setting up a email alias facility for all licensed amateurs. Please make use of the service and don't forget to tell your friends.

Congratulations are also due to Colwyn Low and the AR team. I have heard from a number of members that the improved quality of the AR has been noted and is appreciated. Keep up the good work.

Further to my announcement last month about the Productivity Commission's (PC) review I can now confirm that we have already started informal talks with the commission about the issues that the WIA sees with the current Radio Communications Act (RCA) and its administration. I will ensure that the best interests of all amateurs are represented and will be pushing very strongly to have amateur operators take a much greater part in the administration of all aspects our hobby.

## International News

As I write this month's notes, I wonder what the world will be like when you get to read them. We are all I suspect still very conscious of the impact of the events in the USA on 11 September. Daily we have heard more about the way that events have unfolded. Although none of us can predict the future I am sure that amateur operators will be involved in some aspect of these difficult times. My thoughts go out to all amateurs regardless of where in the world they might be. I would like to think that we are all prepared to support their efforts in any way that we can. I am sure that they would certainly reciprocate their efforts if it were Australia that was in need.

## Membership Issues

A number of us within the Federal council and the Federal executive have

watched with dismay as our membership numbers continue to fall in recent months. As I have already identified in recent articles, new amateurs and new members are critical to the continued success of the amateur service here in Australia. Given the continuing reduction in membership I decided that I would use my notes this month as a means to bring this critical issue to your attention. More importantly I would like to ask you all to help to increase both the number of amateurs and the number of WIA members. It's in all of our interests to increase membership. The more members the better the service and the cheaper that we can make membership fees. If we continue as we are then a number of options will be open to us:

- Increase membership fees to support the current level of services
- Reduce the quality or frequency of AR
- Charge more for services such as the QSL service.

We all know what needs to be done and we all can make a difference.

If we all were to approach one friend and ask if they were interested in amateur radio, and only one in hundred were to succeed in obtaining a licence each year, we could achieve some 400 new amateurs each year.

Make the time to get involved with a local group. This might be a scouting group, a local school or education establishment such as the radio repair group at the local TAFE or the University of the Third Age, or perhaps something such as a local walking club. Offer to give a talk or a demonstration of some of things that make amateur radio exciting for you.

We all know friends who used to be members but have for a number of different reasons decided to not renew. This may be for a number of reasons. Some that I have heard are:

- Ex members have become disenchanted with the people in the organisation and refuse to rejoin whilst these individuals remain. Can I ask that people put these issues to one side and focus instead on the positive aspects of the WIA? Call in on the local radio club or Division. They and the WIA need your support
- Members believe that WIA membership is too expensive. Perhaps they are looking for alternate membership models. Would a family membership help? Would a sponsorship of new amateurs for the first year in the hobby help?
- Some members and ex members have indicated to me that they are dissatisfied with the current State based Divisional structure. We already know that Martin Luther has proposed that the WIA needs a new Federal structure. However at this stage there is simply not enough evidence that people want this change. Here is your chance. Please, please write to me and let me know what you want.

To close can I simply ask everyone who is interested in amateur radio to please make the effort. Individually it might not seem like a lot. Together as the amateurs of Australia we really can make a difference. Just look at the respect that we have for the efforts of amateurs in the USA assisting with the current crisis.

To contact me please use any of the following means:

Email to [president@wia.org.au](mailto:president@wia.org.au)  
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 PO Box 691  
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 ACT 2602

# A Receiving Converter for 432 MHz/70 cm

Drew Diamond, VK3XU,  
45 Gatters Rd.  
Wonga Park, 3115.

In addition to our 6 and 2 m bands, another region of interest to the VHF/UHF enthusiast is the 432 MHz (or 70 cm) band. Lately however, there has been little technical information in the local amateur press for a device which would permit easy, cheap and effective receiving capability on this interesting band. It is hoped that the converter plan offered here may fill that gap.

In use, the converter is quite sensitive; the signal from a HP 608 generator stands right out of the internal noise with the generator at its minimum output of 0.1  $\mu$ V. The VK3RMB beacon at Ballarat, some 200 km away, on about 432.535 MHz comes in at good strength off my little 5-element 70 cm Yagi beam. With the beam directed at Melbourne, no incursions of out-of-band signals have so far been observed. The converter draws 45 mA from a nominal +12 Vdc supply.

## Circuit

The generally accepted method of gaining access to a desired VHF or UHF band is to convert the required band down to a lower one, such as 28 MHz, by mixing the incoming signal with a crystal-controlled local oscillator (L.O.), and thus permit tuning on an ordinary HF communications receiver.

For a 'tunable I.F.' of 28 MHz, the L.O.

must therefore be  $432 - 28 = 404$  MHz. As far as I can determine, there are no stock crystals available which produce this I.F. (an amplified 13th harmonic from a 32 MHz TTL clock oscillator for a 16 MHz I.F. was tried in similar fashion to those used for the converters described in Refs 3 and 4, but the resulting scheme was potentially prone to unwanted signal responses).

See Fig. 1. A 101 MHz 5th overtone Butler crystal oscillator, one of the easiest overtone circuits to get working properly, is powered by a pair of BFY90 transistors Q2 and Q3 (simple single-stage circuits, although of lower component count, are rather too fiddly to get going reliably. See Ref. 1). The oscillator signal is applied to a BFR91 quadrupler Q4, whose collector tank-circuit board strip-line L4, is tuned to the 4th harmonic at 404 MHz. A second strip line L5, coupled to the first, forms a selective filter at 404 MHz. The

resulting L.O. signal is presented to the pin 6 L.O. port of the mixer; a ubiquitous NE (or SA) 602AN.

The NE (SA) 602AN has a published noise figure of 5 dB (Ref. 2), and so an RF amplifier with just a bit more gain than that (about 10 dB in this instance—see Refs 1 and 6) is required as pre-amplifier for weak signal work. Whilst trying to buy some Philips UHF tuner FET's (or similar), I was fortuitously reminded of the availability of reasonably priced NEC NE 72084 GaAs FETs. My guess is that these devices are intended for microwave satellite work. However, for a pre-amp at 432 MHz, they make an excellent low-noise amplifier. Q1 drain load is un-tuned, so the pre-amp, is quite stable. Output signal is applied to the signal port at pin 1 of the '602. The 432 MHz band is selected with a strip-line filter L1 and L2 (similar to that for the L.O.). Rejection of the 376 MHz 'image' ( $404 - 28$  MHz) is -40 dB, and rejection of the 331 MHz 'alias' (3rd harmonic of the crystal at  $303$  MHz +  $28$  MHz) is measured at about -90 dB.

## Construction

A blend of surface-mount, 'ugly' and 'paddyboard' styles were used for the prototype model. The GaAs FET and chip capacitors make it necessary for the builder to have good eyesight, a steady hand, and a fine tipped soldering iron. Components are mounted upon a circuit board ground-plane measuring 115 x 75 mm. It may be double-sided or single-sided foil up. Box walls of about 25 mm height permit mounting the input and output BNC connectors, and +12 Vdc feedthru capacitor.

If you have not used the 'paddyboard' method before, please look up Ref. 5. Figure 2 and Photo 1 show a suggested layout. Start by super-gluing suitably

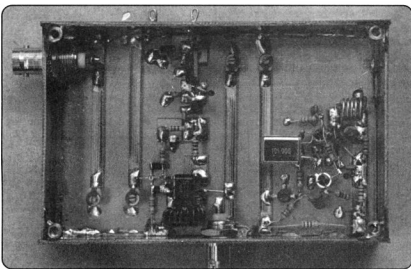


Photo 1. 432 MHz Converter

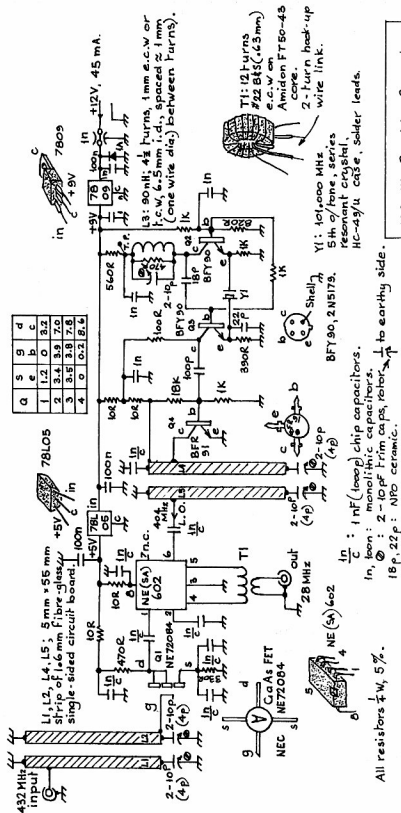
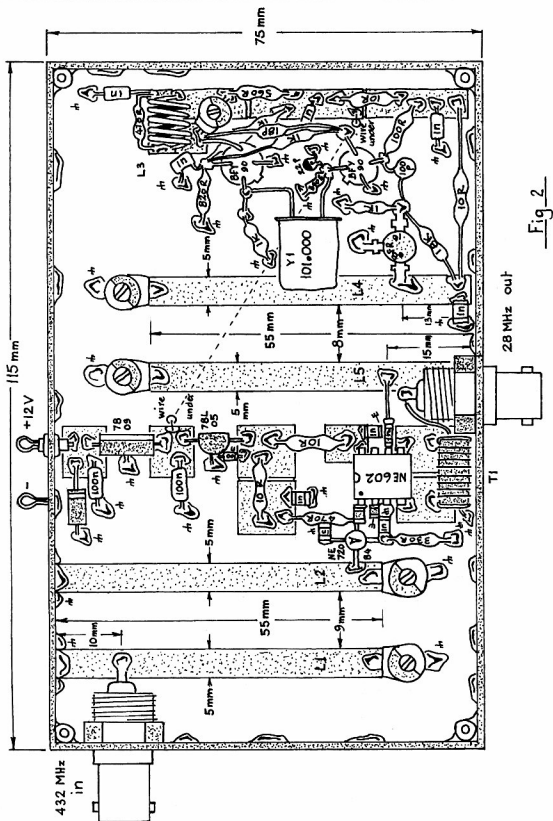


Figure 1. 432 MHz Receiving Converter



Your iron should not be too hot- and check that the mains earth connection is intact. 7809, 78L05 regulator chip, '602 and their associated components may now be soldered in place. The 1 nF chip capacitors are quite fiddly to work with. Grip the part with fine pliers or tweezers, carefully (and quickly) apply a tiny pre-tin to the metal end plates, then solder in place (if you have not worked with surface-mount chip caps before, I suggest you buy two or three spares for practice).

Connection of the +9 V supply for the oscillator and quadrupler is made by means of a thin insulated hook-up wire

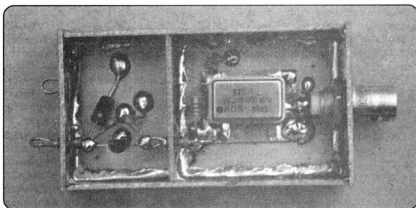


Photo 2. 'Signal-box'

When all components are satisfactorily placed, the side walls may be fitted. Holes for the BNC connectors, and the 1 nF +12 V feedthru cap should be pre-drilled. The ground ends of the strip-lines must be soldered to the inside copper of the walls where the strip abuts, and extra solder flowed immediately adjacent the abutment. Note that the strip-line L4 for the BFR91 collector

must clear the side wall by perhaps 1 mm, where it is by-passed to foil ground with a 1nF chip cap. When positioning the walls, remember to extend them down past the level of the hook-up wire under the main board so that the box thus formed shall sit flat. It is not necessary for a continuous fillet of solder to be applied, just stitch the walls on with a number of regular "tacks". A lid is not essential, but inclusion is highly

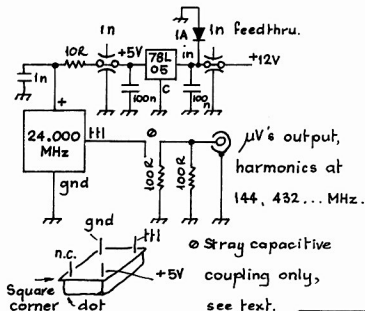


Fig 3

Equivalent Microvolt  
Alignment Signal Source.

**Figure 3. Equivalent microvolt alignment signal source**

recommended. Solder four brass nuts upon the inside corners for attachment of a suitably sized lid made from single or doubled-sided board material. Tuning holes are suggested, as installation of the lid causes a small alteration (about 500 Hz at 404 MHz) in crystal frequency.

## Tune-up

Before applying +12 V supply, visually inspect the job for soldering quality and correct placement of all components. Set the five trim caps for about half capacitance (5 pF). Apply 12 Vdc from a regulated supply. Measure the voltage with respect to ground at the coil end of the 560 ohm resistor at the test point (marked t.p. on the circuit). Adjust the oscillator tank trim cap so that the voltage drops from 7 V to about 6.8 V. When this occurs, the crystal should be operating correctly on the fifth overtone at 101 MHz. The trim cap may be adjusted later if desired to set the crystal spot-on frequency.

If a UHF signal generator is available (one that is stable, and can be accurately varied in level down to sub-microvolt), set it initially for 432 MHz at about 100  $\mu$ V output level (or you could use the third harmonic of 144 MHz if necessary). Connect the converter I.F. output to the input of your 28 MHz receiver via 50 ohm coax, and the generator's output to the converter input with 50 ohm coax. You should detect the signal where

expected. Carefully peak (tuning is very sharp) the quadrupler strip-line caps for maximum signal (don't be deceived by a peak in noise), then peak the input filter caps for best sensitivity.

Should a sig. gen. not be available, and you do not have a local 70 cm beacon signal, consider making a handy little "signal-box" tuning aid, as shown in figure 3 and Photo 2. An ordinary 24,000 MHz computer clock module is mounted upon a segmented paddyboard substrate, which in turn is glued and soldered to a plain circuit board measuring about 70 x 40 mm. Walls (similar to those for the converter) are suggested, although a lid is not mandatory. The 50 ohm internal termination, comprised of two parallel 100 ohm resistors, is coupled by stray capacitance to the ttl output pin of the clock. If made as shown, the equivalent  $\mu$ V level of the harmonic at 432.000 MHz will be about 10  $\mu$ V—quite a strong signal if the converter is tuned up and working properly. If no signal can be detected initially, solder a 3.9 pF capacitor between the ttl pin and the output connector, and try again. The capacitor should be removed later to obtain a suitably low level signal for final tune-up. A 10 dB/step attenuator may be interposed to obtain an equivalent sub-microvolt signal if desired.

A table of typical device voltages, as measured with respect to ground foil

using a DMM, is shown on the circuit to aid in any necessary troubleshooting. A badly wrong voltage would be a vital clue.

## Parts

NE (SA) 602, NEC GaAs FET, BFR91. BFY90's (or 2N5179's), 1 nF chip caps 1 nF feedthru caps and other parts are (at writing) available from Electronic World (ph 03 9723 3860—will answer mail orders). The more ordinary components are available from the usual electronics retailers. See Hamads in this journal for Amidon suppliers. My 101 MHz crystal was purchased from John Freeman (Crystals); 03 9583 4533, and cost \$18 plus p & p.

## References and Further Reading

1. The VHF/UHF DX Book; Ian White, G3SEK (ed.), DIR Publishing, pp 8-4,5,6.
2. "NE602 Primer"; J. Carr, *Elektronics*, Jan. '92.
3. "A Receiving Converter for 2 m"; Diamond, *AR*, Sep. '95.
4. "A Receiving Converter for 6 m"; Diamond, *AR*, Oct. '96.
5. "Paddyboard" Circuit Construction"; Diamond, *AR*, Feb. '95.
6. VHF/UHF Manual; G. Jessop, G6JP (ed.), RSGB.

ar

## Senior Operator, Alf VK2UC

In respect of the current request for info to find our oldest active operator, on behalf of the Summerland Amateur Radio Club and VK2 we present our candidate.

He is Mr. Alf Webb, VK2UC, of Lismore. Alf is now 96 years old, still very active on all bands using both CW and phone. Alf was in the VDC Signals during WW2 using line, radio, semaphore and heliograph. He gained his Licence in 1947 and has been continuously active ever since. His first contact was on 13 June 1947 on 7.100 MHz using CW with Leith Martin VK2EA then at Kangaroo Creek. (Leith's log, he is now in Lismore).

Alf is a foundation member of SARC and has been on the Committee and Club President 1984. Alf's crowded shack represents his long period of activity and is right up to date. His latest rig is the Kenwood TS2000 and his current log is just at 50,000 entries.



Alf VK2UC in his shack

# VI5RAS Special Event Station

## — Activity Report

Godfrey Williams, VK5BGW  
14 Jenolan Cresc.  
Hillbani  
S.A. 5112

During 1997 I wrote to the Director of R. Aust. Sigs., suggesting that a special event amateur radio station would be an appropriate way of contributing to the approaching celebrations for the Corps' 75<sup>th</sup> birthday.

This idea was then forwarded to the Certa Cito committee, which consisted of senior retired signals officers having the task of suggesting and organising events to celebrate this important event. This committee approved the idea and in turn contacted the Colonel Commandant of Central Region (South Australia) Colonel (Retd) Neville Bergen who also embraced the idea. Neville Bergen was the Commanding Officer of the School of Signals in 1975 and organised a special event station for the Corps 50<sup>th</sup> birthday. In Australia only societies, associations etc can be granted a special event amateur licence so it was deemed that the Royal Australian Signals Association (South Australia), who had a few ex Sig amateurs within its ranks, would conduct the event sharing the station with other Australian States who would operate the call on a portable basis.

Subsequently a sub-committee of the Association was formed and consisted of myself, Brian Melville (VK5ABO), Brian Stevens (VK5FV), Lindsay Collins (VK5GZ) now VK2YN and Bill McKeough. Bill who is not a qualified amateur was not able to attend many of the four meetings however provided valuable assistance as a logging operator and also transported three operators and station equipment the 500 miles to the Army Communications Training Centre at Watsonia Barracks in Melbourne. Lindsay with his usual dedication was able to make many interstate contacts with ex Sigs who indicated an interest in participating.

The subcommittee settled into its task quickly and decided that Brian Melville (who is the President of the Association) would be the station manager, Brian Stevens being designated as the QSL manager, myself as station co-ordinator, Lindsay as RSARS. Representative and

Bill McKeough as administration support. Brian Melville provided leadership and advice and a link back to the Certa Cito committee and also in conjunction with his daughter Rachel, designed and produced the station's QSL card. Because of the strong traditional links between R.Aust. Sigs. and Royal Signals the sub-committee deemed it appropriate that VI5RAS should be a member of the Royal Signals Amateur Radio Society for the duration of the year 2000.

### Operation

Conditions at best could only be described as inconsistent, some improvement being noted towards the end of the operating month (November), also because of the passage of continual low pressure weather systems across the country high levels of QRN effecting all bands up to and including 20 metres made it impossible to work weak stations. VI5RAS went to air at 1331 hrs UTC on Tuesday 31<sup>st</sup> OCTOBER (0001 hrs on the 1<sup>st</sup> November in South Australia), operating 20 metres SSB on the short path to Europe. The station was kept busy for some hours picking out stations from the large pileup that developed but many of our operators calling during dawn, daytime and evening hours were disappointed with the poor conditions. It was pleasing to note that amateurs in rare countries were calling us, it was also gratifying to sense the interest and regard that stations had for VI5RAS. Mainly the station was operated from the rostered operator's home QTH except for activity at Watsonia barracks in Melbourne, a brief session at 144 Sig. Sqn. here in Adelaide and by WO2 Steve Salvia (VK8AM) from the signal troop at Norforce (Darwin).

Five of the fifteen operators involved were ex Royal Signals, the association

wishing to commend them for their efforts, Alan Gibbs (VK6PG) deserves a special mention for his work, in operating the station and producing a VI5RAS web site. The other ten operators all being ex R. Aust. Sigs together with the five ex R. Sigs represented all Australian States and the Northern Territory, no operation being conducted from the Australian Capital Territory (Canberra VK1). The total contacts for the month where 2517 (1689 SSB 828 CW) with 121 different countries being worked.

### Life after VI5RAS

From a personal point of view, having a part in the planning and operation of VI5RAS has been the highlight of my involvement in amateur radio, and I doubt if anything radiowise will surpass it, except perhaps if in my 83<sup>rd</sup> year I am fit and well, then I am willing to be involved again in the 100<sup>th</sup> birthday of the Corps.

The Sigs Association here in South Australia is planning to continue it's involvement in amateur radio and has applied for a special licence. Finally I should mention our QSL manager Brian Stevens whose good work will continue on for some time. The whole QSL process is a very responsible job to ensure all cards dispatched are accurate and reflect a professional approach. In retrospect it would have been an advantage if most or all of our operators were in possession of a computer logging program compatible with that of our QSL manager. It would have saved Brian Stevens spending many hours of typing from written log sheets and the information could have been added to the main database by way of a floppy disc.

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# Transforming the New Car

Richard Cortis VK2XRC  
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"I ...have this new (to me) sparkling, and shiny car and three black recycling bins full of radios and stuff which has to go into the car without my wife being in the slightest bit inconvenienced. Her request was that I not make the car look like a fishing trawler. I think she was referring to the antennae. She did not care if it would be easy for me to spot in the carpark."

In about mid 2000, people were starting to point at the rust holes in the old XF Falcon. In about October 2000, my sister visited and announced that she was going to buy a new car and that, really, I should buy one too! After some discussion, it was decided that I would buy her 3 year old car at an agreed market value and she would go and buy something far more ostentatious. So, in

December 2000, I took delivery of a 1997 model Falcon GLL. The bottom of the range, but it had airconditioning and cruise control. I haven't yet worked out what I will do with the cruise control in the Sydney traffic.

I take delivery of my new car, change the rego, put my plates on it, and that is just the beginning. First of all, it took two full days to decommission the old

car. There was the 15 year old 2 m and 70 cm dual bander, the crystal locked RT80 modified to work on two metres, and the Plessey MTR8000 modified to work on six metres. Both the RT80 and the MTR8000 have remote control heads. They need them. The Plessey is about the size of half a slab of beer and weighs quite a bit more. You would not want to carry the RT80 very far either. In the old car, to maintain reasonable family relationships, I had run the remote control cables under the back seat and under the carpet to emerge in the console with discretely located control heads. The dual bander was located in the ash tray hole about a foot behind the gear stick. All this stuff had to be retrieved very carefully. I managed to find and restore the ashtray too. Accordingly, a long time was spent carefully disassembling the car and reassembling it. I

wanted to be able to offer something reasonable to sell too!

Along with all this stuff, I also decided to retrieve the mobile phone hands free kit as it was probably worth more than the car. Having spent about \$1000 to \$1500 keeping the airconditioning working in the old Fally in the last two years, she went for a grand. I hope the new owner enjoys the \$350 stereo that my wife insisted on installing before we went on holidays for Xmas 1999.

I now have this new (to me) sparkling, and shiny car and three black recycling bins full of radios and stuff which has to go into the car without my wife being in the slightest bit inconvenienced. Her request was that I not make the car look like a fishing trawler. I think she was referring to the antennae. She did not care if it would be easy for me to spot in the carpark.

Back to the task at hand. Having shelled out for a sparkling nearly new car (new to me), I thought it was time for a new dual band radio. So I went out and purchased a Yaesu FT8100 with a remotable front panel. This is one of those radios with the ADMS (Advanced Data Management System) software where you program in the memory channels with the computer. Now that was a learning experience! Finally, after several sessions of psychiatric help with various Waverley Amateur Radio Society gurus, the FT8100 was in a state suitable to be installed in the car. Thanks to Mark VK2YZA, Simon VK2UA and Eric VK2KUR.

Because I live and work in the eastern suburbs of Sydney, I spend a lot of time driving on roads with line of sight to the Waverley radio tower that seems to radiate gigawatts of pager noise. So, we have to maintain the old crystal locked RT80 which is very very good at thumbing its nose at pagers. Apart from the odd polite burp, the RT80 seems to tolerate the pagers quite satisfactorily.

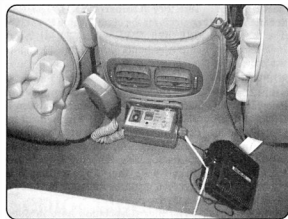


Photo 1. RT80



Photo 2. MTR8000

Okay, we have decided to keep the RT80.

Back from the dim dark distant days of my entry into amateur radio, I have been an enthusiastic fanatic on six metres. So the MTR8000 has to be found a home in the car.

At the front end of the central console, the dashboard of the new car had this sort of recess, which appeared to suggest that there was room for a CD player or something just below the broadcast radio. So, I set about to remove the plastic facade of the dash in this area. Take out the ashtray, undo the screws, lever, pull, lever, pull, lever a bit more, CRACK. Anyway it was out and there was a space for the FT8100. I brought the face of the dash panel up to the shack and, with a hacksaw, sawed the back off the plastic shelf and slid in the FT 8100. Back to the car, and with a certain amount of grunting, sweating and swearing, the FT8100 was set into the dash panel in an acceptable manner. This entire goings on consumed the best part of a day.

On the basis that I was proposing to run the FT8100, the RT80, and the MTR8000, I decided that a separate power supply was required which was independent of the general car wiring. The first thing that I discovered was that the new Falcon was far less friendly in terms of available cable routes from the engine compartment to the passenger compartment. Remember the fishing trawler? Remember also that I have to be quite aesthetic in this work. In addition to the power for the radios, I also needed separate power for the mobile phone hands free kit and an antenna route for the FT8100. I am 1.8 m tall, 110kg, and 54 years old. There did not appear to be a suitable cable route on the passenger side. Accordingly, lying upside down with my head in the driver's side footwell of the car was neither comfortable nor pleasant. However, I did manage to locate a rubber bung with some cable penetrations that also had room for other cable penetrations. The only trouble was that this rubber bung was totally inaccessible to a person other than a dwarf with three elbows. Getting the cable through the rubber bung was another matter.

Having located a suitable cable route, I then had to find a way to get the cable through the rubber bung. I raided the wardrobe and stole a couple of wire coat

hangers. There was washing on the line so I hoped that the coat hangers would not be missed until the car episode had passed from memory. From these I cut three sections of wire approximately 30cm (1 foot) long. I sharpened one end and I cleaned up the other end and soldered the main radio power wire to one, the mobile phone power wire to another and the RG58 coax to the third one. As far as the RG58 is concerned, I cut back the outer sheath about 7cm, folded back the braid, cut out about 5cm of the central core and then soldered the braid onto the needle fabricated from the coat hanger. I then filed off the rough edges of the solder so it would pull through the rubber. The power cables were also smoothed out and the leading edge of the plastic insulation was cut back.

With significant swearing, sweating, and one significant puncture wound to my hand, I managed to push through the needles from the inside and then retrieve them from down in the bowels of the panel work in the engine compartment. I never got to actually see the engine bay side of that rubber bung. All I could do was to feel for it. Hence the puncture wound. Anyway, the cables were pulled through. I duly installed fuses on the ends of the power cables and connected them to the battery terminal. Then I went out with my wife and she wanted to use the broadcast radio. New discovery. This car has one of those coded radios. My sister, who sold me the car, was no help so there was a trip out to the local Ford dealer, complete with detail ID and the car rego. You would think I was applying for a passport or something. Anyway I now have the code for the radio. Be warned.

Once I had the heavy fused power cable through to the passenger compartment, I installed a 35 amp relay which was actuated either by the power



Photo 3. Power cables



Photo 4. Console

from the car cigarette lighter or by a switch. To prevent power feedback into the car system, I installed two diodes on the actuator coil terminal of the relay. One diode for the cigarette lighter circuit power supply (ignition on) and the other for the switch (ignition off). The aim is to avoid damage to the car circuitry and the associated unbelievable costs in rectification. The idea was to be able to operate the radios without having the ignition turned on. That system worked very nicely. The relay was tucked up somewhere inside the front console but I had to take the front panel off yet again. The separate switch was attached to a triple outlet cigarette lighter socket that was also attached to the main power cable. This is so that I can run the GPS in the car at the same time as my wife can charge her mobile phone. The third outlet is in case I am allowed to charge my hand held. The original cigarette lighter remains in its standard format.

Okay, so we have the FT8100 in the

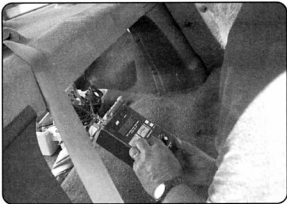


Photo 5. Antenna tuning

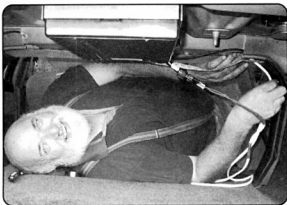


Photo 6. Joint mobility!



Photo 7. The trawler

dash, what about the others? Both the RT80 and the MTR8000 were installed in the boot under the rear window shelf. Holding up the heavy steel bracket for the MTR8000 and then screwing it to the rear window shelf was quite an effort. The RT80 was a bit simpler. Anyway, they both went in and have taken no

on the back of the console on each side of the RT80 control head. I can feel for them and put them away without taking my eyes off the road.

The antenna for the FT8100 dual band radio went on a bracket on the front guard. This is a fairly standard arrangement with the bracket bought

from Dick Smith. The only easy bit. appreciable or useable space out of the boot. I even had to stick my head right down into the boot just to see them.

Next job was to again dismantle the car and run the cables for the remote control heads through to the console. Rip out the back seat, use an old whip antenna as a mouse to push through under the carpet, attach a string, pull the string back and then pull the remote control cables through with the string. This took nearly a day. Small amounts of blood, lots of sweat and some tears.

The substantial control head for the MTR8000 (same size as the FT8100 complete) was installed to the side of the console, at the driver's hip, just outside the seat belt buckle. The RT80 control head went on the back of the console, useable by a back seat passenger if I ever had one. I still have not found a suitable location for the speaker from the RT80. The FT8100 speaker is set in the shelf at the front of the console, in front of the gear stick. Perhaps it should have a friend from the RT80. Microphone holders for the RT80 and the MTR8000 were hung

from Dick Smith. The only easy bit.

I decided that the RT80 would have a quarter wave antenna in the centre of the roof and that the MTR8000 would have a similar arrangement from the boot lid. Drilling the hole in the boot lid was a simple matter as I could get to both sides of the lid to drill the hole. The antenna installation in the centre of the roof had the potential to be fairly difficult. However, it turned out to be quite simple. I removed the central dome light from the head lining and had a look at the roof structure. There was a beam across the roof at the dome light but the head lining could be pulled down a bit to gain access to the roof just in front of the dome light and its associated beam. I started by drilling a 3mm hole upwards through the metal roof sheet from the dome light opening. I then used a large bit and a tapered reamer to enlarge the hole. In hindsight, it may have been a lot easier if I had used the correct size hole saw to make the opening in the roof as the tapered reamer seemed to want to only make a star shaped opening and lots of filing was required to obtain a satisfactorily shaped hole. The antenna cable from the central dome light area was fed through over the hood lining using a flat plastic strip called yellow Tongue. It is the plastic key used in chipboard flooring sheets. Some gets thrown away on most building jobs and it is always useful to have a couple of metres on hand if you occasionally run cables. I keep a bit on the boat too. You could use an old whip antenna if you wanted. The cable was then fed down through the various linings beside the back window and down into the boot. I had attached the cable to the antenna base before installation. This meant that I had to put the BNC connector onto the radio end of the antenna cable in the boot compartment. This required more grunting, more swearing, and profuse sweating.

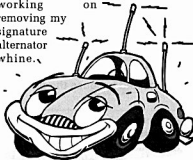
So, out I went in my new car with my new radios to try them out. The first report that I received was from Bruce, VK2JAI who said that I had the most horrendous alternator whine he had ever heard on 70 cm. There was a similar whine, but thankfully less, on 2 m. The MTR8000 has a minor problem. However, the RT80 appeared to be free of alternator whine. Cold comfort!

To treat the alternator whine, I installed a ceramic capacitor from the

alternator output to the body frame of the car. I also installed an in-line suppressor on the main power line near the battery. Thanks to Eric, VK2KUR. These works substantially reduced the alternator whine, however, it still exists and I now have to acquire sufficient strength of character to disassemble the face panel on the console, gain access to the power supply wiring for the FT8100 and install some more suppression in that area. Perhaps it is too hard. On the other hand, do I really want to be recognised by my "signature" alternator whine? I will ponder this question for a while.

I have been trying to manufacture a "City" antenna for six metres. I need a whip not more than 95 centimetres long so it fits in the garage. I have made a helical that tunes a bit but it is "peaky" and does not work very well. The quarter wavelength "country" whip is great. However, the "country" whip does not fit into the garage. I think I need more psychiatric help on this one!

There is still substantially more work to be done to fully commission this car to make it into a half decent mobile amateur station. The old car had a 35 amp alternator. The new one seems to have a high rate alternator, probably with an available charge rate in the order of 60 to 100 amp. I am working on removing my signature alternator whine.



So far, apart from the pain and the puncture wound, it has been fun. I intend to continue the fun, operating mobile every time I am out. I still have to find a location on "The Trawler" for a

10-metre antenna. Who has a design for a 6-metre/10-metre dual band whip? Make sure the "city" version is not more than 95 centimetres long so it fits into my garage!

The project to install mobile amateur radio in my new car has been a challenge, both technically and physically. The work under the dashboard has been good for my joint mobility. The changes in the design and manufacture of motor cars since my last project has meant that the whole project needed to be re-thought, virtually from the road upwards. This is progress and forms part of the challenge. The car does look just a little bit like a fishing trawler, but my wife has taken the end result as an acceptable compromise. I hope my experience has encouraged others to make more significant efforts to "go mobile" on their favourite bands. Have lots of fun setting up your new car and I look forward to working you mobile to mobile on six metres. The next step is to find somewhere to put ten metres!

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## Technical Abstracts

Gil Sones VK3AUJ

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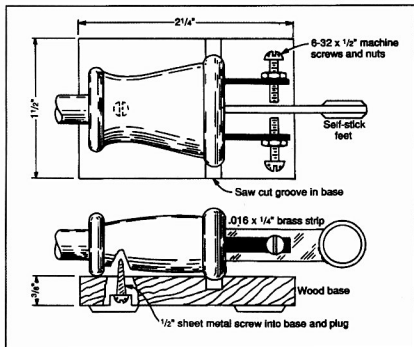
## Power Plug Paddle

In Dave Ingram K4TJW's QRP column in CQ June 2001 an interesting CW paddle is described by Roger Allen N1UIY. The paddle is made out of a standard USA style 2 Pin power plug.

The assembly is shown in Fig 4. The two pins of the power plug are tapped and machine screws and nuts are used as contacts for the dot and dash lines. A thin brass strip is inserted into a slot cut midway between the plug pins and this is the lever of the paddle. Stick on feet are used as the fingerpieces for the lever. The lever is made from thin brass strip. It is inserted into a sawcut midway between the plug top pins. The lever is glued in place. Connections are soldered.

The plug top keyer is attached to a wooden baseplate by self tapping screws. The baseplate is grooved where necessary to fit the plug top.

The device is quite useable and shows what can be done with a little ingenuity and imagination.



#Fig 4. N1UIY Power Plug Paddle

# Recycling a Mobile Phone Hands-Free Microphone/Earpiece

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Elizabeth Downs SA 5113

Like many of the modern electronic devices of today these microphone/earpieces, are "throwaway" if they go faulty! My set was obtained because the particular mobile phone was considered "outdated"!

I looked at the unit with its 2.5 mm stereo phone plug and thought, "I wonder if this can be used with my dual band hand-held transceiver?"

A check with an audio oscillator showed that the earpiece was OK. I also found that the connections for the earpiece were the tip and sleeve (body) of the phone plug. The microphone was a bit more difficult. Luckily I had a small microphone preamplifier PCB, with electret microphone input facilities. Making temporary connections to the ring and sleeve connections, and monitoring the preamp's output on the CRO, soon showed that the little electret microphone worked OK. Now to make it work into the hand-held transceiver!

The instruction book for the hand-held showed that the PTT was worked by grounding the microphone line via a 2.2 k resistor. The audio out was straightforward. A "rats nest" of leads, plugs, sockets, push-button and resistors was soon wired up.

## Trap number one

The PTT was on all the time, although the microphone was OK, listening to myself on the home receiver.

I unplugged the mobile phone microphone/earpiece, and found no PTT lockup! However, plugging it back in again caused the PTT to be on again. I then unplugged the earphone plug into the hand-held transceiver, and there was no PTT made.

Aha! I touched the tip of the earphone plug on to the case of the hand-held, and the PTT was back on! My conclusion? DC Loops!

A 0.47  $\mu$ F capacitor was placed in series with the earth lead of the audio headphone line, and that cured the PTT triggering.

The system was then tried listening to my signal on a 2 m simplex frequency. It sounded OK both ways. With the "rats nest" of components dangling on the wires, I went outside and called for a report on the local 70 cm Elizabeth repeater. Back came Richard VK5ZLR, with a comment, "It sounds OK, but there are some funny squiggles as you move around". Ahhh!

## Trap number two

Don't use the small twin figure 8 cable for the audio-out earpiece lead. I went back into the workbench and changed

it for some single shielded audio cable. It sounded a lot better listening to myself coming back on the repeater, but there was still some instability when the two cables came close to the rubber duckie antenna!

## Back to the workbench

Drawing out the circuit it still appeared that the problem was DC loops in the audio output. I particularly noted that there was a common connection in the mobile phone microphone/earpiece cable. Thinking about the circuit, I believed that the circuit required DC isolation in the earphone wiring. I had some small audio output transformers from old transistor radios, 8 to 600 ohms. I decided to try one of them. The transformer was wired in, the 8 ohms winding to the hand-held, the 600 ohms to the earpiece via the blocking capacitor.

With it all connected up again, I called on the 70 cm repeater. Back came Richard VK5ZLR, "That sounds a lot better". I now had no "funnies" and good audio.

## Tidying up

I purchased a small grey box, approximately 16 mm x 50 mm x 100 mm from Dick Smith Electronics. I then mounted a small PTT button switch, along with the 2.5 mm socket for the mobile phone microphone/earpiece, on the top of the box. The two shielded leads to the hand-held transceiver came out the bottom. I then "borrowed" a large cloths peg from my wife's clothes line, and attached it to the back of the box to enable it to be clipped on to my belt.

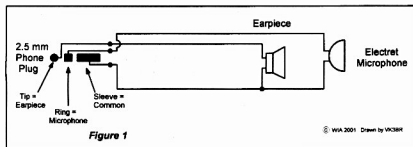


Figure 1, Circuit of the "hands free" Microphone/Earpiece.

With the hand-held transceiver clipped on to my trouser belt, the control box also clipped on to my belt, the lapel microphone clipped to my shirt and the earpiece in my ear, it makes a very neat pedestrian portable set up.

My wife then made me a simple harness of nylon webbing that goes over my shoulder and down my back, where it is attached to a belt around my waist. A pouch/pocket, to hold the hand-held, is attached to the shoulder strap, located up almost at my shoulder. This makes "hands free" pedestrian portable operation quite easy.

Incidentally, there is enough room in the grey box to mount a VOX circuit. However, my wife maintains I should forget about VOX because, if I get puffed out walking, my "Huff & Puff" would trigger the VOX and be a nuisance on the repeater!

Keep your eyes open for one of these "hands free" microphone/earpiece units and you, too, can walk around pedestrian portable, looking like an idiot, talking to yourself!

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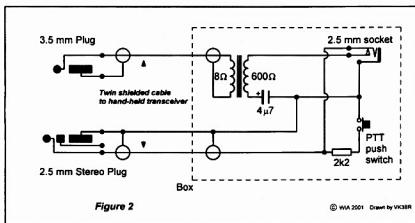


Figure 2. Circuit of the control box linking the handheld transceiver to the Microphone/Earpiece. Note that this circuit depends on the PTT circuit of your particular handheld transceiver - see the text.

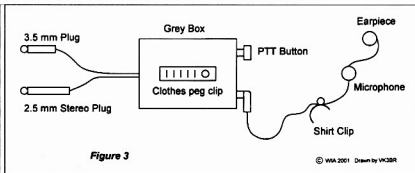


Figure 3. A line sketch of what the completed setup looks like.

## World Trade Center

### This is a copy of the personal message sent to Jim Haynie President of the ARRL following the destruction of the World Trade Center

Jim,  
It is with great sadness that our first contact is to be made at such a difficult time. I do however wish to send you this short note of support from Australia at this time of great grief in your homeland. As many have already said - how do we go about expressing the shock and horror that we all feel at the events that have so shocked the world in the last few hours. I am sure

that the thoughts of hams worldwide are with all of you at this time of distress.

I note that you have already swung the resources of the ARRL into action in order to assist those in need at this time. Please feel free to call on the assistance of the amateur community here in Australia if you believe that we can be of assistance at this time. I pray that this is the end to this madness and that these

terrorist acts do not strike at us again in the coming days and weeks.

I have also attached a copy of the message that I have asked to be posted on our various web pages here in Australia. This message will also go out on the various WIA broadcasts over the next few days.

My sincere condolences

**Ernest Hocking, Federal President,  
Wireless Institute of Australia.**

### In the ARRL Newsletter of September 14<sup>th</sup> the following Hams were reported missing:

**Steven A. "Steve" Jacobson, N2SJ,** 53, of New York City, A transmitter engineer.

**William V. "Bill" Steckman, WA2ACW,** of W Hempstead, New York. He was well known in the NYC area and ran a number of repeaters from the World Trade Center, most notably the 434 MHz ATV repeater.

**Robert D. "Bob" Cirri Sr, KA2OTD,** 39, an ARRL member from Nutley, New Jersey and the ARRL District Emergency Coordinator for Hudson County. A Port Authority police officer, Cirri was on the job helping to evacuate workers from the building when it collapsed.

**Michael G. Jacobs, AA1GO,** 54, an ARRL member from Danbury, Connecticut.

We express our condolences to their families and all the other Hams who have died. We also send our Best Wishes for recover to the injured, for they will live with the memories of this day of horror for the rest of their lives.

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# Ramblings of a Crystal Set Constructor

John Hodgkinson VK2BHO

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Warilla 2528

Every boy or girl who eventually drifted into amateur radio has a crystal set story to tell. From a simple beginning the allure of radio grows until we spend large sums of money and spend much of our spare time chasing something we cannot feel or see. Generally those around us do not understand; it's a form of blood disease called RF poisoning and has been known to be a life long affliction (with no known cure).

I digress. At the age of 8 or 9, I was given for my birthday a "Crystal Set". Presented to me over the laundry tubs on a few old fence palings by my proud dad who had constructed this device from scratch. This basic device of cardboard tube with wire wound on and tuned by a large single condenser, a Perspex tube with a magical cat's whisker and Galena crystal all mounted on a wooden board. It made the "Emmco" earphones give forth with our local radio station 2WL Wollongong. Funny such details are still remembered.

Great, I was off in a world of adventure to where I knew not but come Monday morning I was reminded of the practical side of my new interest by me mum "pack it up now I need to do the washing". Though I never knew it then, I was to be haunted by those words until the present day. Needless to say when I got back to the laundry tubs and reconnected to my aerial and earth the device had ceased to function. I was then on a mission: how did it work? Why did it stop? Who knew my dad was not much help as he had just built and it worked, or so he said. I was on my own once the cat's whisker lost the magic spot on the Galena. The condenser had also moved; it was no man's land for some time.

A school friend discovered some time later had interest, so we pooled resources; we tried black coal, coke, rocks of all descriptions, made lead sulphide (a most unpleasant process) which gave us the best results as I recall. It was blind experimenting but we were always trying to achieve that goal of receiving 2FC from Sydney. He was a good mate for the rest of our school years and we then drifted apart.

In 1949/50 several GeX diodes made

an appearance, a gift from my mates uncle who was a technician on the mobile TB chest clinic of that time. No more cat's whisker as they say it worked every time. With access to the public library whilst at high school and time in the army school cadets signals all this consolidated my meagre misunderstanding of radio. Work at 15 allowed small purchases of components tools including soldering iron, to take place. The battery operated one valve (tube) 1R5 Reinartz regenerative receiver, was followed by 2 then 3 valve mains operated models. The last with plug in coils with which the Short Waves and Amateur Radio were discovered.

In 1957 I left home and joined the PMG as a Technician in Training. I shared a large room in a boarding house at Strathfield with three other like souls. My final Crystal Set was constructed with a single earphone which resided under my pillow the aerial was ten or so turns of fine enamel wire wound on pins around the back of my large old wooden bed head approximately 1m x 1m. The earth counterpoise was the wire spring base. Being in the Homebush Bay area with several transmitters located close by. It provided a choice of stations. Some years later I had the opportunity to visit the 2UW transmitting facility as an old workmate was a duty technician there. Progress now sees this good transmitting site redeveloped as a large sporting complex.

I look back now with good memories of those "Crystal Set" days: the formative years of my introduction to Amateur Radio. It is a pity that in these so called modern times young people of today seemed to be denied the simple beginnings such as an introduction into

the wonderful world of radio. AM radio has been replaced in many areas by FM; not really the domain of the crystal set.

Now with computers, mobile telephones, remote controls and Game-Boys, where is the imagination to follow into amateur radio?

This hobby unless it finds a new image which fires the imagination of young minds to explore and experiment is on a path to obscurity. Why is it that in the past 100 years amateurs have been in the forefront of technical advancement now see their clubs and national bodies which manage the hobby in general decline world wide? Horses and steam trains are no longer a general means of transport. The old bogie CW is nearing a similar position in amateur radio history. 65 years ago CW was king, 50 years ago AM had the crown, 25 years ago SSB had taken over. So what about Packet, RTTY, SSTV and PSK31; where will they be in 50 years time?

The hobby will survive in a form that many present-day amateurs may not like or be able to come to grips with. These changes will reflect different generations and the changing society in which they live. With the ever-increasing pressures, both regulatory and social, placed on our hobby; these changes that take place may not always be for the benefit of Amateur Radio, as we know it today.

With some 50 or so years since my first Crystal Set it has been an exciting journey which I hope and trust others can still follow to fulfil their own personal goals in the company of like minded persons around the world in Amateur Radio for many generations to come.

73 de John VK2BHO



# The DC-2000: An experimental HF direct conversion receiver

Peter Parker VK3YE

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URL: <http://www.alphalink.com.au/~parkerp/>

## 1.0 Introduction

Direct conversion receivers are deservedly popular with those seeking an easy way to receive SSB/CW signals on the amateur bands. They can be simple yet give performance adequate for many applications. Most DC receiver circuitry operates at audio frequencies, making construction easier. Unlike regenerative sets, DC receivers are easily incorporated into transceiver projects. They also have no fiddly regeneration control to adjust. The QRP publications are full of simple DC designs from which to choose.

But what about the experimenter seeking an HF receiver that's better than average? Can direct conversion deliver all of the attributes expected of modern receivers, such as sensitivity, selectivity, stability, strong-signal performance, freedom from spurious responses and quality audio? With the partial exception of selectivity, the answer is yes. And even selectivity can be tightened to superhet standards by using phasing techniques to suppress the audio image.

## 2.0 Project overview

The aim of the project was to experiment with techniques that could be used to construct an HF direct conversion receiver of better than average performance. Experience gained could then be applied to other equipment. The result of these experiments is the DC-

2000 receiver (Photo 1). It draws on the best overseas designs, with compromises to suit locally available parts. Overall parts count and cost compare favourably with receivers of lesser performance.

The DC-2000 provides SSB and CW reception of the most popular parts of 20 and 40 metres. Features such as digital frequency readout, S-meter and AGC were omitted; these do nothing to improve basic receiver performance and increase construction costs.

The finished set is surprisingly simple – just five transistors and three integrated circuits are used. Most unusual is the extensive use of readily-available CMOS ICs and the absence of specialised RF chips. As will be explained later, no performance is sacrificed by this choice. Approximately 50 hours was expended in the DC-2000's development and construction over a twelve month period. Figure 1 is a block diagram for the DC-2000.

This article is for the moderately experienced builder who has already built several HF receivers. For this reason, most space is devoted to discussing why various approaches were (and were not) taken in the development of the receiver. Only limited constructional information is



Photo 1: The DC 2000 Receiver. The front panel is uncluttered with only two knobs and three switches.

provided – it is expected that this article will find most use as an ideas source for receiver experimenters.

## 3.0 Design notes (or why it's like it is)

The DC-2000 consists of six modules. These are:

- Attenuator, high pass filter and RF preamp
- Band Pass Filter
- Mixer/Diplexer
- VFO/Buffer/Regulator
- AF Preamp/Low Pass Filter
- AF Amp

Because the choice of components for each module has a direct bearing on the design of other stages in the receiver, the modules will be discussed in the sequence that they were constructed. The emphasis during construction was on getting a working receiver as early as possible.

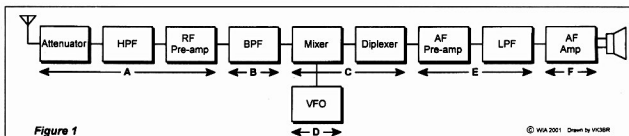


Figure 1

© WSA 2001 Drawn by VK3YE

Figure 1. Block diagram of DC 2000

The following account describes the development of the DC-2000. Special attention is given to the consideration of alternative techniques and difficulties encountered. Mention is also made of compromises where these have been made.

Though the DC-2000 performs well, it is not beyond improvement. Ideas on possible modifications are given later.

### **Module D – VFO/Buffer/Regulator**

The VFO/Buffer (Fig 2) was the first stage constructed. Because the author was more interested in other parts of the receiver, and other builders are likely to have their own favourite VFO circuits, not much time was spent on this section, which came from Reference 1. Suffice to say it provides good frequency coverage with acceptable stability.

The oscillator uses a 3.58 MHz ceramic resonator that is shifted in frequency with a series variable capacitor. In the prototype it covers 3.505 to 3.590 MHz. Because of the harmonic mixing technique used in the mixer, this translates to 7.010 to 7.180 and 14.020 to 14.360 MHz band coverage. The use of a 74HC04 hex inverter chip for the oscillator and buffer also makes it easy to provide two outputs 180 degrees out of phase as required by the IC mixer.

The main compromise with the simple approach used is the combination of a low VFO frequency with a mixer that is designed to work effectively on harmonics. If a tight front-end band-pass filter (selected for the intended band) is not used, there will be reception of frequencies that are harmonics of the VFO's frequency, especially if a non-resonant antenna is used. With the prototype a slight problem was noticed when tuning 14 MHz. Five times 3.5 MHz is 17.5 MHz – near the sixteen metre international short wave broadcast band. At certain times very weak carriers from these stations could be heard while tuning twenty metres with the band pass filter described here. Measures that would reduce or eliminate this unwanted reception include using a 7 MHz VFO instead of the 3.58 MHz ceramic resonator circuit, adding an extra tuned circuit to the front-end band pass filter or installing a 17.5 MHz series tuned trap across the front end. If building a transceiver, connecting the pi-network so that it is common to both transmitter and receiver is another low-

cost means of improving filtering and reducing spurious pick-up.

Notwithstanding the foregoing comments, this VFO achieves a lot with few components. However builders wishing for increased frequency coverage and improved dial linearity should use a conventional VFO circuit, using the 74HC04 as the buffer and phase shifter only. For reasons outlined above, a 7 MHz circuit is preferred to a 3.5 MHz design if eighty metre reception is not required.

Those unable to obtain a 3.58 MHz ceramic resonator can obtain one by sending a stamped self-addressed envelope to the author at the address shown elsewhere in this article.

### **Module C – Mixer/Diplexer**

More thought was given to this part of the DC-2000 than any other. Many devices were considered as mixers before the final selection was made.

Though extremely easy to use, the popular NE602 was soon ruled out. This was for several reasons. The dynamic range, though normally acceptable for Australian amateur conditions, falls short of the best obtainable. The NE602 is also only available from a few outlets and is quite expensive. Probably the most compelling reason for not using the NE602 was that its (largely deserved) popularity over the last 10 years seems to have crowded out alternative approaches. The DC-2000 project provided a good opportunity to try other techniques that are not as widely used as they should be.

Other candidates for receiver mixers include the SL6440 and the MC1496. The 6440 is a high level mixer IC that is much stronger than the NE602. It was used in some British designs, but never caught on in Australia or the US, probably because it was never easy to obtain. The MC1496 was popular in 1980s DC receiver designs, but needs many external components to work. The dynamic range limitations of this IC and its susceptibility to AM breakthrough preclude its inclusion in anything but the simplest of receivers.

In discussions on receiver mixers, the terms 'single balanced' and 'double balanced' are often used. The outputs of most mixers contain signals of several frequencies. These signals include the sum and difference of the inputs and the inputs themselves. Singly balanced normally refers to a mixer where the

local oscillator output has been suppressed from the output. The output from doubly balanced mixers is even cleaner, with both the local oscillator and incoming signals being nulled out. Thus the only two signals on the output of the mixer are the sum and difference of the input signals. The cleaner output from a properly used balanced mixer is an advantage as the following stages are not 'swamped' by unwanted signals on undesired frequencies. Balanced and doubly balanced mixers also tend to have higher dynamic ranges than non-balanced configurations (Reference 8).

Diode double balanced mixers are popular in high-performance direct conversion and superhet receivers. These mixers can either be built from diodes and broadband toroidal transformers or purchased as a pre-made package (eg SBL-1). Again, like the NE602, they are not widely available and a little costly. Extremely high dynamic range and freedom from detection of AM broadcast signals are the main attributes of diode balanced mixers.

Disadvantages of diode mixers include the high local oscillator drive requirements and the need to provide proper 50 ohm terminations at all frequencies if performance is to be maintained. A high-power local oscillator implies high current consumption, which makes diode mixers less practical for portable equipment, where low power consumption is desired.

Diode balanced mixers also have significant conversion loss (7dB typical), which directly adds to the receiver's noise figure. This means that more gain elsewhere in the receiver is needed to compensate if sensitivity is to be maintained. The required gain can be provided at either RF or AF. More audio gain exacerbates the risk of hum pickup and audio feedback – a real risk in DC receivers. Adding an RF preamplifier compromises dynamic range, one of the main reasons for the diode mixer being chosen in the first place! The most well known direct conversion transceiver that uses diode balanced mixers is the 'Optimised QRP Transceiver' by Roy Lewallen W7EL. This 1980 design quickly became a classic and has stimulated much further amateur receiver development, most notably Rick Campbell KK7B's R1 and R2 receivers.

Another approach that was considered

briefly was the use of four FETs in a double balanced configuration. Reference 8 includes such a design which required at least two watts local oscillator drive and a 22.5 volt supply rail. The circuit was considered impractical for a medium-complexity receiver.

So what ended up the winner in the search for a cheap, easily obtainable mixer with a high dynamic range?

Meet the 74HC4066. It contains four electronic switches that can handle RF up to over 30 MHz. The 74HC4066 is readily available at one-third the cost of an NE602. Its performance when used as a receiver first mixer is impressive. Distortion-free dynamic range can exceed 100 dB over most of the HF range – similar to that of leading brand amateur transceivers. The mixer circuit (Fig 3) is very simple and requires just one broadband trifilar toroid to wind. The drive level required is not high – thus permitting simple, low current VFO-buffer circuits to be used, in contrast to diode mixers with their higher drive requirements.

A further benefit of the 74HC4066 mixer is that it can operate on harmonics of the local oscillator (Reference 2). This is a great advantage because several popular HF amateur bands are harmonically related. Using a 3.5 or 7 MHz VFO, it is possible to construct a multiband receiver by switching in band pass filters for the band of choice. Such switching is simple as it requires just two switch or relay contacts to change bands. This makes a nice change from conventional multiband receiver designs, which are a builder's nightmare because of the need to switch several points of the receiver, such as local oscillators, frequency multipliers, mixers and band pass filters to change bands. As mentioned elsewhere, this multiband technique has limitations, but these can be overcome by intelligent VFO frequency selection and sharp front-end band-pass filtering. Performance measurements by ZS6BZP show that the 74HC4066 exhibits good performance when used on both the VFO's fundamental and harmonic frequencies, with only a minor degradation of performance as the received frequency rises.

What are the disadvantages of the 4066 mixer? The first is that it needs two VFO inputs – each 180 degrees out of phase with the another. This was resolved

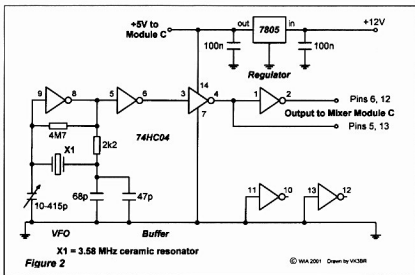


Figure 2. Module D – VFO/Buffer/Regulator

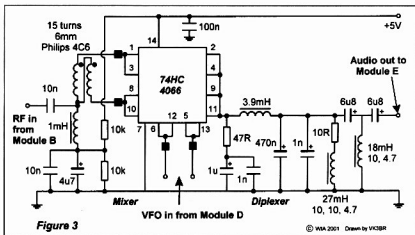


Figure Three: Module C – Mixer/Diplexer

through the use of a VFO/buffer stage based on a 74HC04 hex inverter IC. Though less flexible than other VFO/buffer schemes, it has the advantage of simplicity. Those wishing to use conventional transistor VFOs can still do so, but would need to retain the 74HC04 to provide buffering and the required phase shift.

Most of the other drawbacks are similar to those of diode mixers. These include the need for the mixer to see a 50 ohm load (at all frequencies) to assure peak performance. This requires the use of a diplexer network that is not necessary in simpler circuits. Also the mixer introduces a conversion loss. This necessitates an RF amplifier and/or higher audio gain than in NE602-based designs, where the mixer contributes

significantly to overall receiver gain. More gain means more stages and potential hum problems that are harder to track down. This is why beginners are advised to start with NE602-based receivers first before tackling the DC-2000.

As mentioned previously, the mixer's output needs to see a 50 ohm load (at all frequencies) to perform to specifications. A 47 or 51 ohm resistor from mixer output to earth can be made to work, but will degrade the receiver's noise figure (Reference 3). Instead, it was decided to properly terminate the mixer in a diplexer. The diplexer also provides some audio filtering (300 – 3000 Hz band pass) before the first audio stage. Correct termination and filtering is desirable to assure maximum dynamic range and reduce hum and microphonics.



significantly poorer on the DC-2000 than on a reference HF transceiver.

The wide bandwidth caused by the non-suppression of the audio image (and the 4kHz filter) is the biggest single limitation of the DC-2000. Improvements would include tighter audio filter bandwidths (3 kHz SSB, 1 kHz CW) as per Reference 3 and, for the more ambitious constructor, suppressing the unwanted sideband along the lines of KK7B's R2 receiver.

**Module F – AF Amplifier**

When one is designing a good receiver, one does not expect to get circuit ideas from books written for twelve year old beginners to electronics. However that's what happened in this case.

The first idea was to use an op-amp audio preamplifier and power amplifier using a BD139/140 pair. It worked, but the audio quality was poor and some feedback problems were encountered. The author's efforts to fix these problems were not successful and it was decided to look to other circuits.

To simplify design, it was then decided to accept a lower level of audio output than is available on most commercial transceivers. Speaker reception of most signals in a quiet room became the chosen goal. Where signals were weak, it was accepted that the user might have to don headphones to receive the signal. Using headphones to receive weak signals is normal practice with weak signals on any receiver, so it was not considered that this is a major disadvantage. Also limited audio output made it possible to keep the receiver's power demands down.

The LM386 is a popular candidate for the audio stages of simple receivers. Like the NE602, they give acceptable performance. Again their sheer ubiquity in amateur designs caused me to consider alternatives for the DC-2000.

Several builders have found the TDA2822 stereo amplifier IC a good choice for homebrew receivers. However given that the prototype was close to being an all-CMOS design, it was decided to try a CMOS audio stage first. This temptation was not diminished by having an already built CMOS audio stage in a homebrew transceiver that was being dissembled at the time.

The CMOS audio stage is based on a 4007 inverter chip (Fig 5). The inverters are biased to linear mode by connecting a high value resistor between input and

output. Three stages are used to provide a good level of audio gain. A conventional transistor radio speaker transformer provides 8-ohm audio output suitable for speaker or headphones. Current consumption of this module is low. Though no measurements were taken, signals heard through this stage are pleasantly free of distortion. The stage uses few parts and has proved to be readily reproducible. Again the cost of the CMOS IC is less than the non-CMOS ICs more commonly used in audio modules.

This stage is another example of a technique that is not used as much as it should be in homebrew designs. As far as the author can establish, the 4007 amplifier originated in Reference 4 as an audio amplifier for a TRF receiver available in kit form. The technique re-appeared in the 'Tassie Devil' and 'TDM' QRP transceivers of 1985/6 (Reference 5), but appears to have fallen into disuse since then. However, for its cost the 4007 audio amplifier delivers excellent performance and is a worthy part of the DC-2000 receiver and future equipment.

**Module B – Band Pass Filter**

All receivers should have a bandpass filter in the front end to ensure that only signals within the band of interest present themselves at the receiver's mixer. The importance of a good band pass filter is magnified in this design due to the use of a mixer that is as efficient on harmonics as it is on the VFO's fundamental frequency.

The circuits used (Fig 6) are based on those that appear in Reference 6. The input and coupling windings were experimented with to reduce filter attenuation. A separate narrow filter must be used for each band covered by the receiver. Relay band switching was used to keep leads short. One DPDT relay is required to accomplish this in a

two-band receiver, but more are needed for if extra bands are required.

**Module A – Attenuator, High Pass Filter and RF Preamplifier**

If building the receiver for 7 MHz only, this stage could possibly be dispensed with. However on 14 MHz the RF preamplifier is needed to overcome the loss in the CMOS mixer.

The circuit eventually adopted appears in Reference 7. Medium power transistors were used in order to provide for a strong front-end, able to cope with large signals (Fig 7). The transistor type used is not critical, and there was little variation in performance between specimens tried. Gain is only just sufficient for 14 MHz – modification of this receiver to cover bands higher than 15 MHz will require higher gain in this stage.

Adding an RF preamplifier to a receiver aids sensitivity, but reduces its ability to cope with very strong signals. This is why most receivers include a means to switch out the RF amplifier or introduce front-end attenuation when strong signals are encountered.

To reduce switching complexities, it was decided to add a 20dB input attenuator rather than switching out the RF preamplifier. Switching the preamplifier would require a three pole, two position switch (switching input,

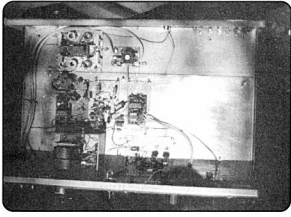


Photo 2: Internal construction of the DC 2000. The VFO/Buffer/Regulator is at the bottom left, near the tuning capacitor behind the partition. The three modules in the centre are (L to R) Mixer Diplexer, AF Preamplifier/LPF, and AF amplifier. Nearest the rear panel is the Band pass filter and one RF amplifier stage. To the right of the VFO is the high pass filter and one RF amplifier module. The attenuator resistors are mounted on the rear of the attenuator switch.

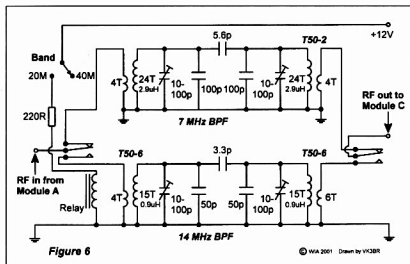


Figure 6. Module B - BPF

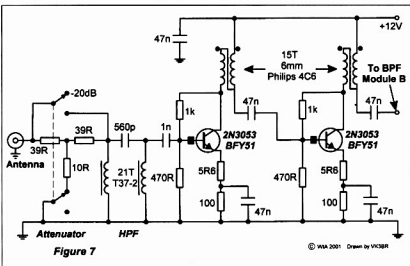


Figure 7. Module A - Attenuator/HPF/Rf Preamp

output and power connections), whereas switching in an attenuator needs only a common two pole, two position switch. The main advantage of switching out the RF preamp is for portable use – the preamp module is very current-hungry, and battery life will be extended if used only when necessary.

No front-end preselector was found necessary. However a high pass filter was installed to attenuate signals below 6 MHz. This prevents any breakthrough from nearby AM broadcast stations. A full preselector could be substituted if reception of undesired frequencies (eg 17.5 MHz broadcast signals while tuning 14 MHz) is experienced. A sharp preselector would also be a worthy

addition if you intend operating this receiver alongside transmitting equipment on nearby frequencies.

## 4.0 Construction

Because of the experimental nature of the DC-2000, a case much larger than that required was used to house the project (Photo One). The enclosure previously housed a stereo graphic equaliser – quite appropriate given the new receiver's quality audio reproduction.

The equaliser's aluminium front panel (which held the slide potentiometers) was replaced with a piece of blank PC board material to form the new front panel. This was spray-painted dark

green.

The front panel is uncluttered, with only two knobs and three switches (Photo One). At the extreme left of the panel are the on/off switch and on indicator LED. To the right is the tuning dial. Near the centre of the panel are the attenuator and band change switches. The latter switches a relay, so there is no need for it to be located near the band pass filters. Moving along is the AF Gain control and the headphone socket. Adequate room should be provided behind the front panel for the VFO to be mounted in an enclosure.

The rear panel is also sparse. Near the band pass filter is the antenna socket. The 2.1mm 12 volt power socket is on the right.

A large piece of unetched PC board material inside the case forms a base plate for the individual circuit modules, which form the receiver (Photos Two and Three). The PC board base plate is screwed to the inside of the enclosure (copper side up) at several points. The nuts can be soldered to the copper to prevent them becoming lost should the receiver be dissembled.

Circuit modules are mounted on smaller pieces of unetched printed circuit board material. It is a good idea to tin these boards before mounting components. Most modules use 'dead bug' construction, except the RF preamplifier, which is built using 'Paddy board'.

These construction methods are not particularly suited to ICs and relays that are designed for PC board mounting. The modules that include ICs – the VFO/Regulator, Mixer/Diplexer, and AF Amplifier – make use of small pieces of plain matrix board to mount the IC and associated components. These matrix boards use PCB pins as standoffs to separate them from their unetched support boards. The relay used in the Band Pass Filter module is mounted in a similar fashion. All boards are mounted horizontally for easy access, apart from the VFO/Buffer/Regulator board, which is mounted vertically.

The photographs show the variable capacitor and VFO/Buffer/Regulator board (Module D) separated from the other parts of the receiver by a partition made of printed circuit board material. This was adequate in the prototype, but a shielded case for the VFO would have been desirable. Other good practices,

such as the use of a vernier reduction drive, solid mounting of components and the use of voltage regulation, should also be followed. The value of the 68 or 47pF capacitors may need to be altered if the VFO's output frequency is not near 3.500 MHz when the variable capacitor's plates are fully meshed. Because the ceramic resonator VFO tunes in a non-linear fashion, it is convenient to tape a calibration chart to the top lid of the receiver just behind the vernier reduction drive.

Once Module D has been completed, construct Modules C, E and F. In the case of Module C, the small parts surrounding the IC are mounted on matrix board, but the diplexer is soldered to the unetched board. Note the use of ferrite beads to offer some resistance to unwanted VHF/UHF signals, such as from local FM broadcast and TV stations. The input toroid is wound with fine enamelled copper wire on a Philips 6mm toroid, 4C6 material. These toroids were obtained from the CW Operators QRP Club. 10 turns on an FT-50-43 should be a reasonable substitute.

The AF preamp and low pass filter (Module E) is constructed 'dead bug style' onto a piece of circuit board material. It is mounted close to Module C to allow a direct connection via the 6.8 uF capacitor. Longer connections between modules use lengths of shielded audio cable to prevent possible hum and feedback problems.

Module F is again built on blank matrix board. Note that the 20M resistors comprise two 10M resistors in series. Again use shielded cable for the connection to the volume control.

The bandpass filters (Module B) are similar to Module C in that a combination of matrix board and 'dead bug' styles are used. In this case only the relay is mounted on the matrix board. The relay itself is not critical and can be any 5-12 volt type. The 220 ohm resistor was selected to provide positive switching when current is applied, yet keep current consumption down if 14 MHz is selected. The compression trimmers used were mounted on their sides, but alternative forms of mounting may be more convenient, depending on the components at hand. The toroids are left free-floating; the gauge of the enamelled copper wire used is not critical (approx 0.5mm), but should be

thick enough to support the toroids.

Module A (the HPF/RF preamp) was built in two stages in the prototype, and thus occupies two separate boards. However, this is not necessary, and could be easily constructed as one assembly. As a precaution against oscillation, a ferrite bead is placed on the base of each transistor. The toroids used are the same as used in Module C.

No attempt was made to build an AC power supply inside the receiver's case, despite there being ample room. If this is done, caution needs to be taken to prevent 50 Hz AC hum interfering with the high-gain audio stages used.

## 5.0 Operation

Using the DC-2000 is very simple - select the desired band, switch the attenuator off, turn the volume up until band noise is heard and tune around for a signal.

Users will appreciate the receiver's low amount of internally-generated noise and good strong signal performance. Audio clarity is excellent. SSB stations with good transmit audio really stand out on this receiver and CW stations sound unusually pure. Another advantage of this receiver is that the 125mA current consumption is less than for other equipment.

## 6.0 Further thoughts

Many improvements can be made to the DC-2000. Some of these, including tighter receiver selectivity, a wider range VFO and the use of techniques to suppress the unwanted sideband, have already been mentioned.

Other possibilities include adding binaural reception and increasing the number of bands that the receiver covers. As demonstrated in Reference 2, this is easy to do if coverage of 21 and 28 MHz is required just by adding suitable bandpass filters. Note though that extra RF pre-amplification may be necessary for these higher bands. Coverage of other amateur bands can be achieved by

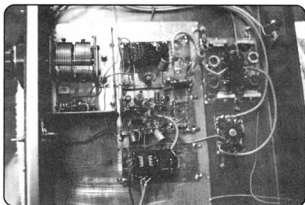


Photo 3: Close-up of the DC-2000 circuitry, taken before Module A was completed.

altering the VFO frequency or adding front-end converters. Another worthwhile area for improvement would be to substitute quieter transistors for the BC549s used. This could possibly allow one RF amplifier stage to be dispensed with and permit even better strong signal performance.

## 7.0 Conclusion

This article has described a direct conversion receiver of better than average performance. Its circuitry is simple, yet use is made of techniques found in leading overseas designs. The absence of specialised RF ICs and the use of inexpensive CMOS chips also mean that component procurement is easier than for other receiver projects.

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## Busy time for fox hunters

Over the past couple of months it has been a busy time for Foxhunting and ARDF. Back in June over the Queens Birthday weekend, the Australian Foxhunting Championships were contested in Mount Gambier. For the first time ARDF was added to the program, as this was the first time for most VK5's, most VK3 competitors had a distinct advantage, having said that there was some very hot competition coming from VK5ZMG it is a shame only the first 3 places are recognised during these championships. Following the ARDF event were another 10 events, challenging teams on 80m, 10m, 6m, 2m, 10cm and 23cm.

Scoring is: First, 3 points. Second, 2 Points and 3<sup>rd</sup> 1 Point. Final results are:

VK3YDF 17, VK5ZMG 16, VK3YQN and VK3WWW 12, VK3OW 9, VK5AXN, VK3JMD and VK3XAJ 3, VK5XSO 2 and

VK3BLN 1. These are only the teams or individuals who managed to place in the first 3, what the results don't show is that most of the teams are only minutes or even seconds separating them. Congratulations to the VK3YDF team making it two in a row.

Some of you may be aware that some VK3 ARDF enthusiasts have taken off overseas to compete in 4 international events. As I compile this report Bruce VK3TJN and Adam VK3YDF have competed in the Region 2 ARDF Championships held in Albuquerque New Mexico, and VE7 Victoria British Columbia Canada for the Friendly Amateur Radio Games. For these events I do not have the official results but here are the results as Bruce and Adam see them.

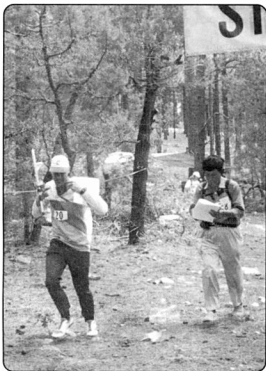
Region 2 Champs 2m event: 1 Ukraine, 2 Ukraine, 3 WIA (VK3TJN),

6 WIA (VK3YDF) 80m event: 1 Ukraine 2 Ukraine, 3 ARRL, 4 WIA (VK3YDF), 8 WIA (VK3TJN).

FARS 2m results: 1 WIA (VK3TJN), 2 WIA (VK3YDF), 3 ARRL.

For the boys this is a real whistle stop tour, they must leave Canada one day after their event to be in Germany for the All German Championships in 2 days time. After leaving Germany they will fly to Beijing and meet up with Bryan VK3YNG, from here they will board the Trans Siberian Express and alight at Ulaanbaatar Mongolia, (JT1) here they will contest the region 3 (our region) ARDF Championships.

If you would like to read a more comprehensive report and see some pictures point your Browser at: <http://streeto.cable.nu/bruce/> For more information regarding ARDF try: [www.ardf.org.au](http://www.ardf.org.au)



Photos, clockwise from above: Region 2 Championships Albuquerque, New Mexico, Bruce VK3TJN in the 80m event; Championship competitors; Adam VK3YDF and Bruce VK3TJN

## Active Door Loop Receive Antenna

An interesting receiving loop antenna was described in Rad Com May 2001 by Ed Chicken G3BIK. The antenna is mounted on an internal house door and is oriented by opening and closing the door. This minimises the space taken up by a receiving indoor loop antenna. A simple tuned loop amplifier is used to enable the loop output to be taken by coaxial cable to the receiving position.

A loop has a bi-directional pattern and so rotation through 180 degrees is sufficient for full coverage. This will not be achieved with most doors but can be very close. Even a lesser swing will give useful results. The idea is to maximise signals and minimise noise. The nulls are very useful for minimising noise signals.

Full coverage from long wave frequencies together with all HF bands can be covered. This requires the use of alternative loops and amplifiers.

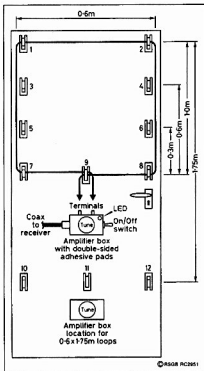
However the parts are all readily accessible and adjustments can be made easily.

Loops are wound on the door using stick on plastic hooks at the corners and at the amplifier connection point. A suitable layout is given in Fig 2.. A variety of loop sizes can be accommodated. Loops ranging in size from 600 mm wide and from 300mm to 1.75m high can be accommodated. The number of turns used can also be varied as required. The loops are wound using 7/0.2mm plastic covered hook up wire. While specialised wire types such as Litz may be desirable for highest Q at long wave the wire used is quite useable and is readily obtainable. The layout using the hooks is given in Table 1 for various sizes of loops.

The frequency ranges for various loops wound with 7/0.2mm plastic covered wire is given in Table 2.. These

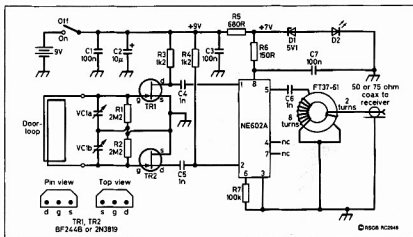
frequency ranges are for the loops using the amplifier shown in Fig 3. with a 2 x 126 pF tuning capacitor. The 2 x 126 pF tuning gang is a type used in the UK for AM/FM tuners and may be available locally. Wider ranges could be covered using one of the old style 400 pF per section AM Broadcast radio tuning gangs.

The loop amplifier is given in Fig 3. A balanced FET amplifier is used to minimise loop loading and this is followed by an NE602 used as an amplifier with a transformer output to coaxial cable. The output transformer is wound on a ferrite toroid type FT37-61. This is 0.37 inches outside diameter and uses number 61 mix. The winding uses solid core PVC covered wire such as that used in telephone cable. The amplifier was built on strip board but ugly construction on a scrap of PCB would be OK.



© RSGB PC2651

Loop Size	Use Hooks	Start/Finish at Hook No.
Width m	Height m	
0.6	0.3	7,5,6,8
0.6	0.6	7,3,4,8
0.6	1.0	7,1,2,8
0.6	1.75	10,1,2,12



© RSGB PC2651

Fig 2. Door with Placement of Hooks, Amplifier, and Tuning Capacitor.

Fig 3. Circuit Diagram of Loop Antenna and Amplifier. For HF VC1a,b = 2x126 pF variable. For 136 kHz VC1a,b = 2x500 pF variable and C4, 5, 6 = 10 nF.

# Technical Abstracts

*continued*

For Low frequency use on long wave use a dual gang 400 to 500 pF per section capacitor and change the values of C4,C5,&C6 to 10 nF. Use a 1.75m by 0.6 m loop of 20 turns. This is for the UK 136 KHz band and other frequencies may need some adjustment. The loop had an inductance of 1.8 mH.

Table 2. Loop Frequency Ranges based on 7/0.2mm PVC covered Hookup Wire and a 2 x 126 pF variable capacitor.

Loop Size m	One Turn		Two Turns		Three Turns		Four Turns	
	L æH	f MHz	L æH	f MHz	L æH	f MHz	L æH	f MHz
0.6x0.3	2.4	11.9-30	8.0	6.3-13.2	15.4	4.4-8.7	24.3	3.4-6.4
0.6x0.6	3.2	10.2-24.3	11.1	5.3-11	23	3.5-6.2	39	3-4.3
0.6x1.0	3.9	8.6-21.2	15.3	5.6-8.4	31	3-5.2	52.6	2.2-3.6
0.6x1.75	7	7-16.2	23.1	3.5-5.9	47.8	2.3-3.6	83.7	1.7-2.7

## Cloud Warmer NVIS Antenna

In CQ May 2001 Arnie Coro CO2KK describes , in the regular Antennas column, an antenna system used during a hurricane net. The requirement was for good communications over an extended local area. The area was from 30 to 500 km from the base control station. The antenna design is for forty metres but a similar design can be employed on eighty metres by scaling the dimensions. A similar effect is achieved by the use of low slung dipoles or inverted vee antennas.

The design maximises radiation upward and the signal is then reflected by ionospheric layers and returned over a wide area around the station. This is ideal for emergency base stations or for nets. The technique is called Near Vertical Incidence Skywave or NVIS for short. You may have used it unintentionally but a little attention to the antenna system can maximise the results obtained.

The antenna is shown in Fig 1. Credit for Fig 1 from the CQ article is given to Olga Dalmau. The antenna consists of an Inverted Vee shaped folded dipole erected above a reflector element. The close spacing causes the basic dipole feedpoint impedance to fall to the 10 to 15 ohm region and the use of a folded dipole brings this back to between 40 and 60 ohms. A balun should be used and an air cored balun would be suitable. The reflector element is erected a minimum of 1 metre above ground and a 2 metre height is preferable. But check the EMR issue.

As the reflector is close to ground and is also very close to the dipole element you will need to tune it. This can be done simply using a dip meter lightly coupled to the reflector. Adjust the length to a frequency 5 % lower than the operating

frequency. For an operating frequency of 7.1 MHz the reflector should be tuned to resonate at 6.745 MHz. You can couple to the centre of the reflector by making a small temporary coupling loop at the centre of the reflector element. A one turn 25mm diameter loop will have minimal effect on the result.

The feed to the folded dipole can be coax and a balun should be used. An air core balun is simple to make and cheap. An air core balun will also not suffer from the effects of saturation of the core which can affect the operation of baluns using ferrite or powdered iron cores. An alternative is to use open wire line for the feeder with an antenna tuner. This may help with frequency excursions and allow operation on 10 MHz if required.

EMR considerations may cause you to

mount the reflector at a height above ground of between 3m for 3.5 MHz to 3.5m for 10 MHz operation for a 100 W SSB station using a speech compressor. For 400 W increase the height by another 1m to 1.5m. The closest approach here is to the back of the beam and hence more than 45 degrees off boresight and 2m is allowed for the height of a person. The upside of this is that people will not be tripping over the antenna. The dipole centre point would also need to be increased over that shown in Fig 1 to allow for the added height of the reflector. Alternatively restrict access to the antenna but this will require restricting access to a rectangular piece of land around the antenna. It may be easier to go up.

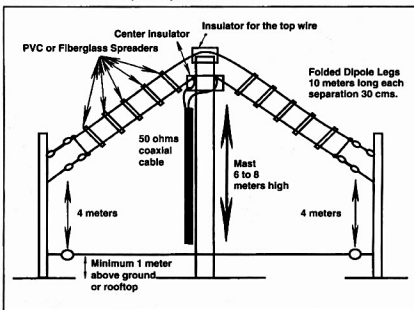


Fig 1 CO2KK's NVIS Antenna From CQ May 2001 drawn by Olga Dalmau.

# GIPPSTECH in pix

**Gippstech 2001 Technical Conference, July 7 and 8**



**Presentation of Ron Wilkinson Achievement Award. From left: David Minchin VK5KK, Russell Lemke VK3ZQB, Trevor Niven VK5NC, Colin Hutchesson VK5DK**



**Ron Cook VK3AFW discussing antennae**



**Peter Freeman VK3KAI, organiser of the Conference**

Photographs by Ron Fisher VK3OM

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D 3670

\*10kHz steps only.

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VX-5R pictured showing  
large frequency digits

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# Division Directory

The Amateur Radio Service exists for the purpose of self training, intercommunication and technical investigation. It is carried out by amateurs who are duly authorised people interested in radio technique solely with a personal aim and without pecuniary interest.

The Wireless Institute of Australia represents the interests of all radio amateurs throughout Australia. National representation is handled by the executive office under council direction. There is one councillor for each of the seven Divisions. This directory lists all the Divisional offices, broadcast schedules and subscription rates. All enquiries should be directed to your local Division.

## Broadcast schedules All frequencies MHz. All times are local.

**VK1 Division Australian Capital Territory.**  
GPO Box 600, Canberra ACT 2601  
President Gilbert Hughes  
Secretary Peter Kloppenburg  
Treasurer Ernest Hosking

VK1GH  
VK1CPK  
VK1LK

**VK1WI:** 3.590 LSB, 146.950 FM each Thursday evening from 8.00pm local time. The broadcast text is available on packet, on Internet [www.radio.amateur.misc](http://www.radio.amateur.misc) news group, and on the VK1 Home Page <http://www.vk1.wia.ampr.org>

**Annual Membership Fees.** Full \$77.00 Pensioner or student \$70.00. Without Amateur Radio \$48.00

**VK2 Division New South Wales**  
109 Wigram St, Parramatta NSW  
(PO Box 1066, Parramatta 2124)  
(Office hours Mon-Fri 1100-1400)  
Phone 02 9689 2417  
Web: <http://www.ozemail.com.au/~vk2wi>  
FreeCall 1800 817 644  
e-mail: [vk2wi@ozemail.com.au](mailto:vk2wi@ozemail.com.au)  
Fax 02 9633 1525  
President Terry Davies  
Secretary Barry White  
Treasurer Pat Leeper

VK2KDK  
VK2AAB  
VK2JPA

From VK2WI 1,845, 3,595, 7,146\*, 10,125, 14,160, 24,950, 28,320, 29,120, 52,120, 52,525, 144,150, 147,000, 438,525, 1281.750 (\* morning only) with relays to some of 18,120, 21,170, 584.750 ATV sound. Many country regions relay on 2 m or 70 m repeaters. Sunday at 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2 m, 70 m, 23 cm. The broadcast text is available on the Internet newsgroup [www.radio.amateur.misc](http://www.radio.amateur.misc), and on packet radio.

**Annual Membership Fees.** Full \$78.00 Pensioner or student \$61.00. Without Amateur Radio \$47.00

**VK3 Division Victoria**  
40G Victoria Boulevard Ashburton VIC 3147  
(Office hours Tue 10.00 -2.30)  
Phone 03 9885 9261  
Web: <http://www.viawic.org.au>  
Fax 03 9885 9298  
e-mail: [viawic@viawic.org.au](mailto:viawic@viawic.org.au)  
President Jim Union  
Secretary John Brown  
Treasurer Barry Wilton

VK3PC  
VK3JJB  
VK3XV

**VK3BWI** broadcasts on the 1st Sunday of the month at 20.00hrs Primary frequencies, 5.615 DSB, 7.085 LSB, and FM(R)s VK3RML 146.700, VK3RMM 147.250, VK3RWG 147.225, and 70 cm FM(R)s VK3ROU 438.225, and VK3RUM 438.075. Major news under call VK3ZWI on Victorian packet BBS and VIA VIC Web Site.

**Annual Membership Fees.** Full \$78.00 Pensioner or student \$61.00. Without Amateur Radio \$47.00

**VK4 Division Queensland**  
PO Box 199, Wavell Heights, Qld. 4012  
Phone 07 3221 9377  
e-mail: [office@wispowerup.com.au](mailto:office@wispowerup.com.au)  
Fax 07 3266 4929  
Web: <http://www.wia.org.au/vk4>  
President Bill Riis  
Secretary Bruce Jones  
Treasurer Bill McDermott  
Office Mgr John Stevens

VK4YCU  
VK4EHT  
VK4AZM  
VK4AFS

**VK4WIA** broadcasts on 1.825 MHz SSB, 3.605 MHz SSB, 7.118 MHz SSB, 10.135 MHz SSB, 14.342 MHz SSB, 21.175 MHz SSB, 28.400 MHz SSB, 29.660 MHz FM (ptr), 147.000 MHz, and 438.525 MHz (in the Brisbane region, and on regional VHF/UHF repeaters) at 0900 hrs K every Sunday morning. QNEWS is repeated Monday evenings, at 19.30 hrs K on 3.605 MHz SSB and 147.000 MHz FM. On Sunday evenings, at 18.45 hrs K on 3.605SSB and 147.000 FM, a repeat of the previous week's edition of QNEWS is broadcast. Broadcast news in text form on packet is available under WIAQ/VKNET. QNEWS Text and real audio files available from the web site

**Annual Membership Fees.** Full \$83.00 Pensioner or student \$71.00. Without Amateur Radio \$52.00

**VK5 Division South Australia and Northern Territory**  
(GPO Box 1234 Adelaide SA 5001)  
Phone 0403 368 066  
web: <http://www.sant.wia.org.au>  
e-mail: [peter.reichelt@bigpond.com](mailto:peter.reichelt@bigpond.com)  
President David Minchin  
Secretary Peter Reichelt  
Treasurer Trevor Quick

VK5KK  
VK5APR  
VK5ATQ

**VK5WI:** 1827 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.800 FM Midlura, 146.900 FM South East, 146.925 FM Central North, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 USB, 7.065 USB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. The repeat of the broadcast occurs Monday Nights at 1930hrs on 3.555MHz and 146.675 MHz FM. The broadcast is available in 'RealAudio' format from the website at [www.sant.wia.org.au](http://www.sant.wia.org.au) Broadcast Page area.

**Annual Membership Fees.** Full \$82.00 Pensioner or student \$68.00. Without Amateur Radio \$54.00

**VK6 Division Western Australia**  
PO Box 10 West Perth WA 6872  
Phone 08 9351 8873  
Web: <http://www.vk6wia.org>  
e-mail: [vk6wia@inet.net.au](mailto:vk6wia@inet.net.au)  
President Neil Penfold  
Secretary Christine Bastin  
Treasurer Bruce Hedend-Thomas VK6OO

VK6NE  
VK6ZLZ  
VK6OO

**VK6WIA:** 146.700 FM (R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz. Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busseton, 146.900 (R) Mt William (Bunbury), 147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900, 147.000, 147.200, 147.250 and 147.350 MHz. Also in "RealAudio" format from the VK6 WIA website

**Annual Membership Fees.** Full \$67.00 Pensioner or student \$61.00. Without Amateur Radio \$36.00

**VK7 Division Tasmania**  
PO Box 371 Hobart TAS 7001  
Phone 03 6234 3553 (BH)  
Web: <http://www.tasnet.edu.au/tasonline/vk7wia>  
also through <http://www.wia.org.au/vk7>  
e-mail: [batesjw@netspace.net.au](mailto:batesjw@netspace.net.au)

VK7ZAX  
VK7RT  
VK7RT

**VK7WI:** 146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.725 (VK7RNE), 146.625 (VK7RMD), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart), repeated Tues 3.590 at 1930 hrs.

**Annual Membership Fees.** Full \$85.00 Pensioner or student \$72.00. Without Amateur Radio \$52.00

**VK8 Northern Territory** (part of the VK5 Division and relays broadcasts from VK5 as shown, received on 14 or 28 MHz).



## VK1 Notes

### Forward Bias

The guest speaker at the general meeting on 27 August, was Peter Illmayer (VK2YX).

Peter is one of the driving forces behind the Internet Radio Linking Project (IRLP). He goes round the various amateur radio clubs to talk to this subject. He explained how to set up for IRLP and what you need to do to make it work for you. It so happened that the August issue of Amateur Radio carries a detailed article on this subject (Novice Notes) written by Peter Parker (VK3YE) and David Cameron (VE7LTD). So, for some of us who had read the articles,

Peter confirmed what we already knew, IRLP is a very useful new way of communicating with amateurs around the world using a computer and a transceiver. One important requirement is that a node has to be established that uses a local repeater for its operation.

The time available to attend local meetings has been reduced considerably for our treasurer, Ernie Hocking (VK1LK), now that he has been promoted to President of the WIA. The committee is looking for a replacement Treasurer as Ernie wants to concentrate on federal matters exclusively. For those

with ambition, put in a stint as Treasurer, and, before you know what's happening, you become president of the WIA.

The next Trash & Treasure event is to take place in the Scout facility car park, on Saturday, November 24, 2001. Sellers are to park their cars with the boot facing the centre of the car park from 12.00 pm. Buyers are let in at 1.00 pm. Foldup tables (3) can be hired for \$10 on the day. The Farrer hamshack will be open for inspection at the same time.

The next General Meeting will be held at the Scout Hall, Longerenong Street, Farrer, at 8.00 pm. See you there.

**Stephen Kloppenburg VK1CPK**

## VK4 Notes

### Qnews

### Teletext pages

Those on the Teletext linked packet system, (P29/ZL/VK/ZS), should check out the experimenters' section on index page 102. Here you'll find 'heaps' of interesting home brew items such as: - Antenna & General Formulae, SWR Bridge for QRP work, Grid Dip Meter, DIN plug soldering made easy and a microphone for hands free use. Almost 80 items you'll discover. Just connect to a Teletext supported BBS and type TT then page 102.

Stations without teletext can obtain pages automatically.

Send a personal message to VK4WIE: - address: sp ttupd@

VK4WIE.#BNE.QLD.AUS.OC

title: request (has to be lower case!)

body: PAGE NUMBER(s) YOU

REQUIRE

1 PAGE PER LINE

3 REQUESTS PER MESSAGE

/ex

### Radio scouting

JOTA/JOTI-October 20 & 21 2001!

<http://jota.scouting.net.au>

VK4 Coordinator Email to [rosstutin@bigpond.com](mailto:rosstutin@bigpond.com)

Amateur Radio operators should now be receiving calls from their adopted Guide and Scout groups throughout Australia regarding participation in JOTA/JOTI 2001. VK4 area groups confirmed as participating so far are

*Alice River Scouts VK4SAR with Don/ VK4MC and MATMAN at Camp Gedling, Herveys Range*

*Blewater Guides with Ian/VK4ZT, Wayne/VK4YWG and Phil/VK4HSV at Guides Camp, Blewater.*

*Blewater Scouts VK4SBW with Iain/ VK4IGM and Sheila/VK4PAL at Camp Tarmaroo, Blewater.*

*Kirwan Scouts VK4SCK with Gavin/ VK4ZZ, Mark/VK3TCD and Jessica at Mount Elliot National Park- Alligator Creek*

*\*new\* Mighty Burdekin River Aitkenvale and Ingham Scout Groups with Mario/VK4MS at Broadwater State Forest near Ingham.*

*\*new\* Milchester, Richmond Hill and Wulguru Scout Groups VK4SCT with Bob/VK4WJ at Bivouac Junction near*

**From Alistair Elrick VK4MV**

Charters Towers, on the banks of the Mighty Burdekin River.

Groups who have so far notified that they still want operators are Pimlico Mundingburra Scout Group and Rasmussen Scout Group. If you are a ham who is eager to participate in this worldwide event, contact your local Amateur Radio Club or Area Coordinator.

### In the air on the air

VK4's Redcliffe & Districts Radio Club Inc. ran a radio link, at the request of Redcliffe City Councillor Ian Poyitt, from an aircraft to Redcliffe Radio Station 99.7 FM. The link commemorated the 70th anniversary of the Tiger Moth. There were approximately 100 old aircraft participating in this rare flypast.

A hand held scanner's audio was fed directly into the mixing desk. A 2 metre radio using a quarter wave antenna from the aircraft, then a crossband link to take the 2 metre signal from the aircraft and re-transmitted, this on 70cm using the clubs new YASEU FT-847.

The flight went off without a hitch with Steve Harris VK4HRS as the

## Division News

(Aeronautical Mobile Announcer) having flown for the first time and enjoyed himself immensely. Well done Steve and all at the Redcliffe Club.

### Fishing in space

A 'pop-up' satellite tag retrieved by a beachcombing dog has recorded the 1100-kilometre journey of a black marlin tagged last November off Cairns (VK4). The tag washed up at Brunswick Heads in northern New South Wales and was posted back to CSIRO Marine Research at Hobart for analysis.

The tag was attached to the fish for a month, before becoming automatically detached. The tag showed that the 80-kilogram marlin swam southeasterly with the East Australian Current, and rarely dived deeper than 120 metres.

Pop-up tags transmit details of diving patterns, water temperatures and daily locations to satellites, after they have become detached from the fish. The

*continued*

volume of data they transmit is limited by battery power. A full record of the fish's movements can only be recovered in the rare event that a tag is returned. In June last year a black marlin tagged near Cairns four years earlier was recaptured after a 14 000-km journey to Costa Rica.

### 3RTF beacon

Bob VK4GX reports on a 'beacon' operating on 28.400 MHz. He'd like to hear from others in the Pacific region who can copy it. The format is 28.400 USB signing 3RTF then a long carrier with a 50 second or so break then starts up again. Bob is copying it at about strength 5 at his location NorthWest of Brisbane. Info to chipman1@dingoblue.net.au

### Rescue Radio VK4

This year the Sunshine Coast Club had another successful Lighthouse activity

weekend at the Double Island Point. For those that remember last year they rescued a young couple that took their 4WD for a major swim! Well this year 2 young couples borrowed Mums Nissan 4WD took it through a rough bush track and ended up hitting a tree at a great rate of knots! The amateur radio crew all chipped in with some panel beating and got them back to Elanda Point some 60 km away... me thinks next year, stay away from Sunshine Coast... or at least don't step on a black cat!

### VK4DX

Although not the official WIA site, you might like to check out this newly updated page. <http://www.vk4dx.net> Mike VK4DX says it includes an international HF radio contest calendar with contest rules and a new software links page, with download links.

73s from Alistair

## HOUSE FOR SALE

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## VK7 Notes

### QRM

Following the inauguration of Tasmania's first IRLP mode operations by our No 1 experimenter Tony, VK7AX early in September the bug has bitten quite a few of our amateurs. Tony has been activating this mode on our three 2 metre repeaters in the Northern part of the State, VK7RMD (Mt. Duncan), VK7RNW (Lonah) and VK7RAA on Mt. Barrow. Congratulations go to Al, VK7AN for making the first call—to Darwin starting a procession of contacts around the globe. We expect to see, or should I say hear, a lot more activity from now on.

If you haven't heard our Spectrum broadcast this month there's a simple explanation—it has not been on! Tony is at present enjoying a well earned holiday on the island up north but assures us "Spectrum" will be back later

in the month—wait for it.

As all knowledgeable amateurs know Tasmania is at the forefront for renewable energy and our hydro is now branching out into wind power with the construction of three wind turbines at our windiest point, Cape Grim. Our north-west branch's treasurer is in a management position and at this month's meeting presented a brilliant inter-active CD presentation of these turbines. They're BIG—each weighing about 150 tonnes, the three blades have a turning diameter of 66 metres (200 feet!) and the turbine nacelles would accommodate over 100 people standing up. Each produces 1750 kW. of power. We were IMPRESSED. We now wait to be able to see them in action.

Cheers for now

Ron, VK7RN

# Updated InstantTrack Version 1.51 Released

Paul KB5MU, reported last month that InstantTrack 1.51 has been released. This is a free update for users of version 1.50. The main features in the new release apply to AO-40 attitude support. AO-40 has its 'antenna-farm' on the opposite side to previous phase-3 satellites and up to now, this has necessitated a small manipulation of the attitude data to make it work.

The new version accepts the data as-is without any adjustment. Just be careful though as some sources list the Bahn co-ordinates in the reverse order to the way InstantTrack expects them. The numbers are entered on the same line, Lat first then Lon with a comma separating them. Going back to the early days of AO-10 these figures were given the names 'alat' and 'alor' to distinguish them from the navigational parameters Latitude and Longitude. This worked well until some sources of information began referring to them as Bahn latitude and Bahn longitude or blat and blon for short and ... listed them in the reverse order with a slash separating them instead of a comma. All a bit confusing really and it remains so today. So you need to be careful when entering the numbers to make sure they are entered in the correct order.

All this will be irrelevant if the 3-axis stabilisation system works as expected on AO-40 (see below). Under on-board-computer control, the speed of the three momentum wheels will continually be adjusted to cause the spacecraft antennas to point towards the centre of the Earth.

The old attitude figures won't mean anything any more. The new update of InstantTrack has a feature to take care of this too. You can enter an attitude of "local-vertical" in the attitude column or just "L" will do. The program will show the squint angle and "best-comms-footprint" under 3-axis control.

You can also use this setting to simulate the situation with the UoSat satellites which are stabilised by the "gravity-gradient-boom" method. This is a very simple method of satellite attitude control involving a system which, once deployed, is entirely passive. Wouldn't it be nice if the designers could have used it on AO-40? Unfortunately it's a method only suitable for satellites in a low-earth-orbit. Look on the SSTL web

site for more details of this interesting method of attitude control.

Momentum wheels require precision engineering to produce and are costly pieces of machinery ... and they require motive power. The wheels on AO-40 are breaking new ground in using magnetic levitation instead of mechanical bearings. Providing lubrication to rotating momentum wheels has been the bane of satellite designer's lives. The MIR space Station had to have new momentum wheel assemblies shipped up via supply rocket every few months. They were very unreliable due to the difficulty of effectively lubricating the bearings in zero gravity. They were shipped up in batches and often the attitude control of MIR became critical as one by one they would fail. If you plan to use AO-40 you should have this new version of InstantTrack. Visit <http://www.amsat.org/amsat/instanttrack/beta.html> to download a copy.

## Minimum Cost Satellite Station

With AO-40 turning on some excellent performances during the transponder tests, quite a few people have been turning their minds to putting together a set of equipment for AO-40 which would not cost the Earth. There has been lots of discussion around this topic on the AMSAT-BB. Howard, G6LVB, has reported that he built an entire AO-40 station for under \$500 U.S. and (as if that wasn't enough) he pointed his antennas out of the window of his basement apartment and made some contacts on AO-40. If you would like to see how he did it, have a look at his web site, [www.g6lvb.com/el/index.htm](http://www.g6lvb.com/el/index.htm). You can view a description of Howard's entire station and see how you, too can be part of the AO-40 experiment without breaking the bank.

## More Success with Momentum Wheel Tests

AO-40 command station members Stacey Mills, W4SM, and James Miller, G3RUH, conducted another momentum wheel testing session during orbit #365. Once again the tests proved successful. The wheels were spun up to 100 RPM and were left at this speed for some 30 minutes. Telemetry before and after the spin-up was nominal. Following this second successful series of tests the control stations are quietly confident that we have a working 3-axis control system. More tests will be done over several weeks before the spacecraft will be transferred from spin stabilisation into 3-axis stabilisation mode. The AO-40 team will use the reaction wheels to

## The AMSAT group in Australia

The National Co-ordinator of AMSAT-VK is Graham Ratcliff VK5AGR. No formal application is necessary for membership and no membership fees apply. Graham maintains an email mailing list for breaking news and such things as software releases. Members use the AMSAT-Australia HF net as a forum.

## AMSAT-Australia HF net

The net meets formally on the second Sunday evening of the month. In winter (end of March until the end of October) the net meets on 3.685 MHz at 1000UTC with early check-ins at 0945UTC. In summer (end of October until end of March) the net meets on 7.068 MHz at 0900UTC with early check-ins at 0845UTC. All communication regarding AMSAT-Australia matters can be addressed to:

AMSAT-VK,  
GPO Box 2141,  
Adelaide, SA. 5001.

Graham's email address is:  
[vk5agr@amsat.org](mailto:vk5agr@amsat.org)

aim the satellite's antennas and, (when they are unfurled), its solar panels. The latest testing has paved the way for deployment of the solar array. As those already listening or using AO-40 can testify, signals are already very strong on S-band. Given a fully deployed solar array and 3-axis stabilisation, signals on the ground can be expected to rise to their design level. This situation should usher in an era of smaller and simpler ground stations unheard-of in previous Oscars. We live in exciting times.

## Eclipses begin for AO-40

AO-40 has entered a long period during which (for the satellite), the Earth eclipses the Sun near perigee. The eclipses began around the end of August and they will rapidly increase in length. The eclipse situation will continue until the middle of 2002. During September 2001, eclipses were due to peak at around 85 minutes in duration and at times like this alterations need to be made to transponder scheduling. In order to conserve the batteries the S-2 transmitter, and the middle beacon will need to be turned off from time to time. The on/off times will be adjusted slightly as the eclipse times alter. Keep an eye on the AMSAT BB for the latest on transponder scheduling.

## Try this simple test device

I must caution that I haven't tried this yet myself as my S-band dish is undergoing mods. It's so simple that it's worth a try. Please let me know if it works for you.

Getting hold of a reliable signal source for S-band testing has always been a hassle. This item appeared on the AMSAT bulletin board a few weeks ago under the pen of Barry Hawkes, N1BAN. He does not claim originality but has developed the design to work with a ten metre transceiver rather than the 6 metre device originally proposed. Here is Barry's (slightly edited) post.

"I read somewhere .... that a 2400 MHz signal generator for AO-40 could be made by connecting two, 2 watt resistors and a 1N4005 diode in parallel across a coax connector. In turn the device was connected to a 50 MHz transmitter running at 2.5 watts. The

48th harmonic of 50.0 MHz is 2400 MHz. A caution was to not have the signal generator touch the S-band antenna". Barry continues, "I made up a similar device and operated it using a ten metre transceiver. I was able to get S9+ signals from the ten metre harmonics as described below. A ten watt resistor and a 1N4005 were soldered in parallel across the center terminal and mounting hole of a SO-239 panel jack. This was connected by a short length of coax to a 10 metre transmitter running about 5 watts in CW mode. The device is placed within a few inches of the S-band antenna", (or a short distance in front of your dish).

Barry listed several frequencies in the 10 metre band which have very close harmonic relationship to the S-band beacon, for example, the 84<sup>th</sup> harmonic of 28.5875 MHz will produce exactly 2401.350 MHz. Barry tried several harmonics and each produced S9 readings on his 821H with a no-signal noise level of S2. I'd like to hear from anyone who tries this simple device. I'll certainly give it a go when my dish mount mods are finished.

## Tiungsat-1 celebrates first anniversary on 26th September, 2001

Sangat, 9M2SS, from the Malaysian control centre for Tiungsat-1 announced recently that the satellite was one year old and invited comments from amateur radio users. He also stated that application had been made for an "oscar" number for Tiungsat-1.

During its first year of operation, Tiungsat-1 has been an excellent performer. It is only the second amateur radio satellite (after UO-36) to boast a 38400 baud download speed and user-switch-on for the downlink transmitter. The signals have been very strong from day-1 and a download efficiency of 100% is indicated for most of every pass. My best total digital download ever was from a pass of Tiungsat-1 during its first month of operation. The pass yielded over 2.8 megabytes of data including telemetry and housekeeping. This is very close to the theoretical maximum for an overhead pass. Hearty congratulations to all concerned with building and operating Tiungsat-1.

## Yet another Starshine

Starshine is a NASA educational project in which over 25000 school students from 21 countries have taken part. Twenty-four Australian schools are involved in the current Starshine-3 project.

The Starshine satellites take the form of a hollow aluminium sphere about a metre in diameter. They are built at the US Naval Research Laboratory and are designed to be launched from the Space Shuttle. The outside surface is covered with small mirrors and a couple of other experiments. Student involvement in the project includes polishing the mirrors, recording the telemetry on 145.825 MHz and predicting times when sunlight can be seen reflecting from Starshine's mirrors (and of course, verifying the predictions by actual sightings).

Along with the APRS satellite, PC-Sat mentioned in last month's column, several other small satellites will be launched on the same rocket from Kodiak, Alaska, hopefully before you read this column. Starshine-3 is one of them, the Kodiak launch affording the opportunity to bring it forward rather than waiting for a ride on the Space Shuttle. No doubt keps will be available shortly after launch and you can take part by listening for and recording the telemetry or by visual sightings. You will need a tracking program like SatSpy for example, which is excellent for predicting visible passes of satellites, or you can use the www-based site <http://www.heavens-above.com/>. If you do record the telemetry you can send it to the control team by email. Any search engine will find the address.

The telemetry will be reading the rate of reduction of the spin rate of the satellite. This drop in spin-rate is mainly affected by eddy-currents in the aluminium sphere caused by interaction with the Earth's magnetic field. It is very difficult to calculate and the telemetry will shed new light on the problem. The visible flashes from Starshine are about as bright as the 'top' star in the Southern Cross (Gamma Crucis) and the flash rate depends on how fast the satellite is spinning.

Starshine-2 (somewhat out of sequence) will be launched in Dec 2001 from the Space Shuttle and two more, Starshines 4 and 5 are due for launch in 2003, both of which will have a means of altering the spin rate as part of the experiment.

# Modification of D4825 6m half wave vertical for 50.110 MHz

Peter Blundstone VK7KP  
'Barclay', Whitemark  
Flinders Island TAS 7255

This half-wave vertical antenna, as bought from Dick Smith Electronics, part number D4825, resonated on 53 MHz. However, I required it to work well on the 50.110 MHz call frequency.

Contact with the manufacturer, D & G Antennas, suggested two modes of modification:

- (a) Lengthen the vertical element; or
- (b) Modify the loading coil.

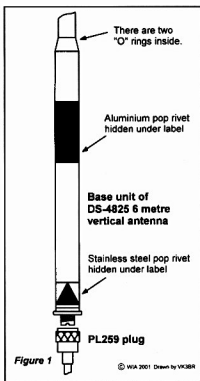
I opted to modify the loading coil. Here are the steps I followed.

First, I drilled out the pop rivets carefully with a 1/8" inch drill. The top one is aluminium and the bottom one stainless. Both rivets are hidden under the labels (see Fig 1).

There are two "O" rings inside the casing. I pushed the stub down into the base about 1 1/2 inches and then pulled it back up. The rings could then be rolled off the stub, but it was very firm!

The stub then slid down through the base. I attached a PL259 plug to the base to make it just a bit easier to get a grip.

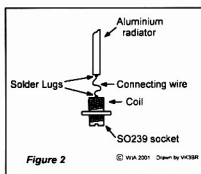
Inside the base was a connecting wire from the coil to the aluminium radiator, soldered to lugs (see Fig 2). I extended it by 3 cm, but it probably could have been 4 cm to bring the SWR even lower. According to the manufacturer, on the phone, extending this connecting wire has an effect five times greater than



extending the radiator. That is, extending the connecting wire by 1 cm has the same effect as extending the length of the radiator by 5 cm.

I then slipped it all back into place without the "O" rings and, with two very small self-tapping screws in place of the rivets, I checked the result.

When it was adjusted to my requirements, I used a smear of Vaseline on the "O" rings, and sealed the aluminium joints with silicon (tape probably would have been just as good) to keep the water out.



## AMSAT continued

### AO-40 K-band transmitter test successful

Yet another successful test has been announced by Stacey Mills on behalf of the AO-40 control team. On Orbit 396 during the period MA 118 to MA 138, the K-band (24.048 GHz) transmitter was activated. The passband and beacon were first detected by Petra G4KGC (operating the radio) and Charlie G3WDG (operating the dish) at 1930 UTC, ie. MA 122. Shortly thereafter the beacon and passband were also detected

by Michael, OH2AUE. Petra and Chas used a 22 cm offset dish and reported signals 6 dB above the noise floor. Michael used a 60 cm dish and reported that the beacon was 7 dB above the noise floor under less than ideal conditions with overcast skies and occasional rain (see note below). Both used linear feeds and reported good, stable signals except for cyclic deep fades due to the linear polarization of the K-band transmitting antenna, the linear polarization of their feeds, and the rotation of AO-40. A circularly polarized feed should eliminate these spin fades and if 3-axis stabilisation comes about should disappear altogether.

Stacey reported that the command team was delighted by the news and we can expect details soon of more tests on K-band and further details of the equipment used on the ground. Communication via K-band raises some very interesting potential problems. The frequency is close to the natural resonance of the water molecule and for this reason any communication over distance on this band is fraught with difficulty. It will be fascinating to see what operating procedures are developed to cope with the very high rate of doppler and the vagueries of K-band.

Congratulations to the control team and to Petra, Chas and Michael for breaking new ground with AO-40.

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## Spotlight on SWLing

By Robin L. Harwood VK7RH

### Mixed reception

In September I was up in Queensland holidaying with some friends and relatives and have not been doing much listening on the radios. I did bring my small Chinese-manufactured Digitor synthesized portable. It is very basic and also very wide.

What has been very surprising is that how different reception can be between various locations. For example on the Sunshine Coast, I was staying in a high-rise apartment block and the higher frequencies between 15 and 21 MHz were excellent but it is a very different story down at Beenleigh, which is approximately half way between Brisbane and the Gold Coast. Here the lower bands are excellent particularly in the evening hours. Stations in the Pacific Islands and Nuigini come in very well. I am hoping that I will be able to eventually get a decent receiver at this locale to do some real monitoring.

I have noticed that the BBC is much harder to hear in SE Queensland since they stopped broadcasting to Australasia. Yes there are domestic stations relaying the "Beeb" here in Brisbane at odd times, particularly 4RPH on 1296 kHz. Down in Tasmania, it is much easier to find them on shortwave, which I expect has a lot to do with the latitude. It is also interesting that daytime propagation on 9 and 11 MHz, which is common down there, is a rarity. This will change at the daylight lengths. Also the lower frequencies will clearly become unusable in the afternoon and evening hours because of the constant atmospheric noise from lightning and storms. At the present time, SE Queensland is pretty dry and they are predicting a drought. It is unclear whether sufficient rainfall will be generated during the cyclone season. It is quite usual to see lightning flashing on the horizon up here, particularly in the evening hours, although the storms can be very far away.

#### Web 5, SW nil

There are rumours that more major broadcasters will be scaling back their shortwave operations in favour of a web-based delivery. The Swiss now only broadcast to Africa and Asia on

shortwave and no longer employ any senders from Switzerland. The Belgians are likewise shutting down their Wavre complex, relying on facilities elsewhere in Europe, namely in Germany, the CIS and French Guiana. Radio Austria International in Vienna, drastically scaled back their operations and commenced leasing their senders to other broadcasters such as Adventist World Radio. Also the external service was merged with the domestic Austrian networks, which will see them increasingly relayed in preference to specialised programming for international audiences.

#### Digital shortwave?

Also the future of digital radio on shortwave is still up in the air. Although the Germans recently trialed DRM on MW in Berlin, the results were mixed. No commercial receivers are readily available and it seems that it is the politicians and bureaucrats who are driving it and not the marketplace. DRM is supposed to be on shortwave as from 2002 but it is primarily the Germans and the Dutch who seem keen. The "Eureka" DAB concept has largely been abandoned although it is in very limited operation within the UK. Again sets capable of decoding the format are available but not in commercial quantities being so expensive in comparison to analogue models. Other European nations decided not to use DAB in favour of DRM. The Americans are not interested in either format being market-orientated.

#### Clandestine transmissions

There also has been a dramatic escalation in clandestine broadcasting especially on shortwave, particularly in the Middle East. Iran and Iraq seem to be the primary targets as well as

Palestine. America, Israel and Russia seem to be the main backers but surprisingly the French are starting to get involved. Recent clandestine transmissions on 17520 kHz are believed to be coming from Issoudoun in France. It may have been a satellite switching error that saw these transmissions emanate from France or a more direct involvement. Many seem to emanate from hired senders in Germany or the CIS although Merlin is known to be broadcasting clandestine Nigerian programming.

Merlin, which was born out of the break-up of the BBC World Service and is primarily responsible for the operation of shortwave senders, has itself become a major operator of many international senders on contract, hiring airtime to maximize their usage. Recently Merlin entered into an agreement with the United Arab Emirates (Abu Dhabi) to manage their senders, which saw the utilization by several religious outlets, provided they were not in Arabic or target specific regions. Merlin also act as brokers for other broadcasters who are trying to acquire senders for their programming, in a similar manner to Deutsche Telekom. It was Merlin who found the overseas relay facilities for Radio Australia in Taiwan and the UAE.

Don't forget that on the last Sunday of this month, Europe, North America plus the CIS (former Soviet Union) revert to their standard time. This will mean that there will be considerable frequency adjustments to take account of the alteration in propagation from the Northern summer to winter. Here in Australia we also move our clocks forward the same weekend in NSW, Victoria, the ACT and South Australia. NZ and Tasmania went to Summer Time on the first weekend of the month.

Well that is all for this month. Good monitoring and 73,

Robin L. Harwood.

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## Don't forget those ALARA Contest logs

It was marvellous to have such support, including so many OM's who were there for the whole time. Logs can be sent by snail mail to VK3DMS QTHR the callbook, or by email to gdsyme@hotmail.com. Please use MS Word or MS Excel or plain text.

If you have not already applied for an ALARA Award, now is the time. You need just 10 contacts with YL ALARA members from at least 5 Australian states. Many of the participants this year will have achieved this, as there were stations from all the states (except, maybe VK8) at some time or another.

All you need to do is to send your log into Jean Shaw 10 Huntingfield Drive, Hoppers Crossing, 3029 Vic., with \$3A or 4 IRCs. The certificate will be an attractive addition to your shack decoration.

## The Lighthouse Weekend

This is the report from Susan VK7LUV.

*We arrived at Low Head Lighthouse on Friday afternoon, having seen snow on the mountains all the way, to be greeted by the most horrendous gale force winds! As Alan (VK7JAB) and son, Jade, attempted to get a 15m dipole up into the air it decided to rain as well, though as a spectator I confess to being rather amused by the sight as the wind was blowing the rope, wire (fishing sinker!) and all sideways while they wanted it go upwards in the tree. However, after about 2 hours we had the 15m dipole and a wire for 80m 'up in the tree' as it were to provide us with antennas for operating from the cottage. Incidentally, the cottage we stay at is at Low Head Pilot Station and a great place to stay if anyone travels down here on holiday!*

*The bonus to our operating conditions for the ILLW 2001, as compared to ILLW 2000, was that we had 240v power which meant we could operate anytime, day or night, for as long, as we liked without having to worry about flattening the car battery and enabling us to use more than 40 watts! Most of our contacts were actually made from the car parked*

*beside the lighthouse with vertical whip antennas for 10m, 15m and 20m (but with the 240v power). I must admit though, that my nerves are not as strong as those of my OM and the wind rocking the car at times worried me!*

*However, all in all a great time was had, though the 3 children spent most of the weekend inside the cottage with games, books, television, etc. Between the 2 of us we made approximately 135 contacts into 19 countries with 21 lighthouses around the world, including Northern Ireland, Belgium, U.S.A., Sweden, as well as Australia and our neighbours New Zealand. We have already booked in again for next years ILLW on 17-18 August 2002 and for anyone who is interested they can have a look at the list of this year's participants, as well as those booked in already for 2002, at <http://www.vk2ce.com/> as Kevin, VK2CE is the Australian co-ordinator for this special event.*

## Visitors from interstate

Recently Marlene VK3WQ and her OM Jim VK3DL visited Adelaide. Marlene was there to attend a school reunion at Immanuel College. It must have been fun to meet all those boys and girls you went to school with fifty years ago.

While they were in VK5 we took the opportunity to have a luncheon for them. The VK5 girls do this as often as they can when they know there are interstate visitors around.

This time the lunch day coincided with a regular lunch for AHARS so in all there were there were 14 OM's and 4 YL's present. Meg VK5YG, who suggested the luncheon, was joined by Maria and Christine to meet Marlene. Maria's OM Keith, who does not usually come to these luncheons came along to renew the friendship he and Jim have developed through their many caravan trips. Unfortunately, Jean VK5TSX, the VK5 State Rep was away on a caravan trip!! Several others also made the effort and Dave VK5NU called in especially to see them.

We YL's thoroughly enjoyed the few hours together. It is most assuredly a great hobby we share. We may not meet

often, and may only hear each other on the radio but when we do meet it is as if we last saw each other a few days ago.

## Would you like to join but don't know how?

If there are any YL readers who want to know more about ALARA or who would like to join us there are several ways to do so.

If you are at a Hamfest and meet some YL's why not ask them about it? They may direct you to your State Rep or may give you our distinctive bright yellow application form on the spot. Or you could write directly to our Treasurer Bev VK4NBC. It is only \$12 a year. For this you become part of a worldwide association of women who are interested in radio. You do not have to be an operator to be a member. We have a number of ladies who have been members for many years without becoming operators.

We have members from many countries. In fact approximately half our membership are DX members. Many of these are sponsored by a VK YL or VK member. When you sponsor someone into ALARA you are often given reciprocal membership of their YL association. BYLARA is the UK group, CLARA is the Canadian, YLRL is from the USA and WARO is from New Zealand. Most groups have a magazine or newsletter. As a member you will receive a copy several times a year to allow you to catch up with what is happening somewhere else in the world.

ALARA publishes a Newsletter four times a year. In it you will hear news from all over and read about the places people have been. It also keeps you up to date with forthcoming activities including all the YL contests held throughout the year.

The State Reps for each state are:-

For VK2/1 Dot VK2DB  
For VK3 Judy VK3AGC  
For VK4 Margaret VK4AOE  
For VK5 Jean VK5TSX  
For VK6 Poppy VK6YF  
For VK7 Susan VK7LUV

Please join, I am sure you will enjoy it.

## More internet treasures

Over the past few weeks I've been investigating a number of interesting Internet sites on telegraphy and electronics. The amount of information contained within these sites is absolutely astounding. As much as I would love to take it all in its just impossible especially with family and work commitments at the moment, its just a matter of sifting through each site in turn and absorbing the information relative to your needs.

So let's continue on with the July column in relation to interesting telegraph Internet sites.

### Dxer.com-Morse code (CW)

Address: <http://dxer.com/cw.html>  
This is just a brief overview of Dxer.com site; it's worth looking at.

This site contains a number of links to other telegraph societies from around the world. Some of these societies are as follows:-

1. EHSC - Extremely High Speed Club.
2. HSC - High Speed Club.
3. SOWP - Society of Wireless Pioneers.
4. Vibroplex - Vibroplex Collectors Page.

Moving along will have one of the best sites so far found on the Internet.

### PA3BWK's Ultimate Morse Code Website

Address: <http://www.morsecode.dutch.nl/index2.html>

This site is absolutely amazing and contains the following:-

1. CW Links This contains commercial software and links to other telegraph sites.
2. Morse Code Dr. This is a question and answer forum.
3. Morse Code Clubs Current clubs from around the world.
4. Art Page This contains artwork, poems and comics with a telegraph theme

5. Various Contains such things as PDF Library, CW Study Tips and Building

### Projects

Let's have a look at "Building Projects" Opening Building Projects you are give a Project List that contains such things as:-

Antenna's, RX, TX, Amps, Morse Circuits and a wealth of other technical information for the home brewer. Under each of these headings you are given a list of projects to build. For example looking at "Transmitters" we have at least 10 different projects to construct, some of these include the following:-

1. QRP HF TX.
2. 250mw HF CW TX.
3. 1 Valve CW TX.
4. QRP SSB HF TX.

I would rate this site as excellent and strongly recommend it to you.

Moving along we have,

### Morsum Magnificat The Morse Magazine

Links to other web sites of Morse interest.

Address: <http://www.morsum.demon.co.uk/links.html>

Again another excellent site to visit with a wealth of historical and technical information. This site contains a number of main headings and under each heading is a particular topic relating to that heading.

The main headings covered here are as follows:-

1. Samuel F.B. Morse
2. Morse Telegraphy-articles and online information
3. Telegraph Museums and Collections
4. High Speed Morse contests
5. Clubs and Organisations with an interest in Morse
6. Morse for the disables
7. Maritime Morse
8. Morse Miscellany

9. Morse Practice Schedules
10. Morse Programs Available
11. QRP (low power operating)
12. Suppliers of Morse equipment

Let's take an example: "Morse Programs Available"

Under this main heading we have about 14 different Morse related programs from around the world, some of these programs are:-

1. G4ZFE CW Pile Up Simulator
2. Morse Code - From Canada for beginners and experts
3. NuMorse - a shareware Morse tutor for windows.

It would take many a long hour to go through all of these programs but I'll give it a go and report my findings in later issues of this column.

Other sites on the web are:-

1. NW7US Morse Code Radio Center  
Address: <http://cw.hfradio.org/>
2. VK3NDS Amateur Radio Website

Address: <http://www.tbsa.com.au/~dsimp/cw.htm>

3. Morse Code Practice Oscillator by Tony Van Roon - Using the common IC 555 Timer Chip  
Address: <http://www.uoguelph.ca/~antoon/circ/morse1.htm>

4. Last is the Morse code pileup trainer for sound blaster compatible sound cards

Address: <http://packages.debian.org/stable/hamradio/pileup.html>

Well this concludes telegraph Internet sites for the time being or until I come across one of interest and of course I will let you know.

My email address is in doubt at the moment as I am with one.net. Temporary e-mail address is: [vk2sps@yahoo.com](mailto:vk2sps@yahoo.com)

See you next month

Steve VK2SPS

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Another quiet month with not too much to report. If you have news from overseas that you would like to share with our members, please snail mail or e-mail me. Thanks.

## New amateur satellite to link remote APRS nodes

A new Amateur Radio tracking and communications satellite called PCSat is scheduled to launch September 1 (0100 UTC) from Alaska. PCSat will augment the existing Amateur Radio Automatic Position Reporting System (APRS) by providing links to the 90 percent of Earth's surface not covered by the terrestrial network.

Designed and assembled by midshipmen at the Naval Academy in Annapolis, Maryland, PCSat's first mission was to provide practical hands-on experience in support of the students' aerospace curriculum. The midshipmen worked under the guidance of Academy Senior Project Engineer Bob Bruninga, WB4APR—the acknowledged “father of APRS.”

“We hope that PCSat will be a new direction for amateur satellites by serving the communications needs of travelers with only mobile and hand-held radios anywhere on Earth,” Bruninga said. PCSat will be the first satellite to report its exact position directly to users via its onboard GPS. This means that whenever the bird's in view, users won't need tracking software to determine its position.

According to Bruninga, the satellite will demonstrate vehicle tracking and communication for GPS-equipped remote travelers—including Naval Academy vessels at sea, cross-country travelers, expeditions or anyone far from the existing APRS terrestrial tracking infrastructure. <<http://web.usna.navy.mil/~bruninga/digis.html>>

In addition to its APRS capabilities, the satellite will offer 1200 and 9600-baud packet operation on VHF (145.825 MHz) and UHF (435.250 MHz). For APRS digipeating, the satellite will use the recognized North American APRS frequency of 144.39 MHz.

Bruninga said that PCSat should make a great classroom tool, since its telemetry can be received by any hand-held packet radio for display to students on their PCs. “And with the Internet connectivity of ground stations worldwide,” he said, “classes are not limited to observing passes only over their school, but anytime PCSat is in view of any other participating school.”

PCSat was deemed spaceworthy last month. Bruninga left this week for Alaska and the launch preparations. PCSat will be one of four satellites in the Kodiak Star payload, and the only one with Amateur Radio capabilities. The others are Sapphire, Starshine III, and PicoSat.

For more information, visit the PCSat Web site, <<http://web.usna.navy.mil/~bruninga/pcsat.html>>

(From ARRL N.L. 10/8)

## German amateur receives high award medal

On July 12 Eberhard Warnecke, DJ8OT received from the German Government, one of the highest medal award, the “Bundesverdienstkreuz”. He received this medal for his service to Amateur Radio and his contribution towards international friendship. Eberhard is a founding member of the DIG, “Diplom Interessenten Gemeinschaft” (Award interest group). This group has 6000 members in over 120 countries.

(From dl-qtc 8/01 via vk4bdq/)

## SMS messages for amateurs

Two-way radios, including selective call facilities and pagers, have started to become obsolete and beginning to disappear in the age of mobile phones and SMS messages. It is not a new idea to use SMS messages together with amateur equipment.

Around the year 1995 at a conference, Guenter, DK7JW introduced this as a

general concept. In 1997 the German amateur radio club recommended a suitable frequency in its band planning. The frequency chosen is on the 70 cm band, 439.9875 MHz. Some students at the University of Kaiserslautern built a small transmitter for study purposes. Klaus, DL3KBH wrote a thesis on this subject. In the process a small transmitter had been built and installed at the DB0XO digipeater.

The basic idea was to transmit alarm and status information to the Sysops. At that time there was no intention to extent the project, or look at network capabilities.

During 1998, Klaus finished his thesis and the discussion started about the creation of a network. The first two transmitters were built, based on a 80C31 controller, RAM, ROM and a few analog components for the modulation part. Information being transmitted via packet radio protocol and the controller translated this into the POCSAG format. POCSAG is a protocol to encode and decode pager messages in accordance with the CCIR 418-1 recommendations. A lot of groundwork, in software and hardware, has been covered between 1999 and 2001.

Since June this year the latest software release has been available (use your search engine and type POCSAG).

What can be done with a system such as that? The server can address any pager known in its database. If the MyBBS address of the pager owner is known, any message can be passed on immediately. If a network is created, any message can reach you countrywide without knowing the digipeater. For people using DX clusters there is no need to use a PC, they will be informed on the spot. Some work still has to be done to integrate and adapt the software to the different Mailbox systems. On the hardware side very little is required, changing a crystal and shorting a filter.

(from DL-QTC 8/01 via VK4BDQ)

## Beyond Our Shores

### Discovering Amateur Radio

Not really news but I thought it was amusing and may cause a smile on your face.

*Reported in the Aug 17 ARRL News Letter*

We've never heard this one before: ARRL staffers have heard a lot of stories from members about how they became interested in Amateur Radio, but, as Assistant Circulation Manager Kathy Capodicasa, N1GZO, says, "We've never heard this one before!" As she relates the story, she spoke to a mom who had placed an order on behalf of her young son for Now You're Talking and ARRL's Tech Q&A. "When I asked her how her son found out about these titles, she informed me that they had been at the dump and her 11 year old son started snooping around among the magazines and newspapers dropped off for recycling, and he came across the July

issue of QST," Capodicasa said. "She told me that he hasn't been able to put it down since." Of course, an easier—and less messy—way to find out more about Amateur Radio.....!

### HF Pack

Over the past few months I have been amazed at the number of QRP stations I talk to overseas. Pedestrian Mobile, Bicycle Mobile, all with good signals and running 5 watts or less. Perhaps it's the innovation of the Yaesu FT-817 that has been the inspiration. In September QST, Roger Burch, W4FN, wrote an interesting article on HF Pack. Back in November 2000 Roger started a group called HF Pack expecting possibly 50 to 100 members. Today it has a membership over 1,000. Common calling frequencies for SSB are 14,345.5, 21,437 and 28,337 kHz. (Though most of my QSOs have been on CW). If you are interested and have internet capabilities, try: [groups.yahoo.com/groups/hfpack/](http://groups.yahoo.com/groups/hfpack/)

(from Sept QST).

### LF Pack

As well as the movement to QRP, there is also a movement to the Low Frequency band between 160-190 kHz. Amateurs spanned the Atlantic Ocean last year and this year the Pacific Ocean was spanned with a transmission from ZL6QH being received by VE7SL in British Columbia, Canada, on 184.4 kHz. A path of 11,709 km. Seven New Zealand stations and one Australian took part in the test. ZL6QH transmitted

dual frequency CW with two minute elements. One frequency representing dits, the other dahs. The ARRL has petitioned the FCC to authorize allocations at 136 kHz and in the 160-190 kHz band. The petition is pending. (from Sept QST)

### Novice Study

The Novice licence in the USA was first introduced in the 50s as a method for people to enter the Amateur Radio Service. As you are no doubt aware, the Novice licence was retired in the USA a while back. However, there are still some 40,000 Novice licences still existing, declining at about 6,000 per year through non-renewal and up-grading.

The ARRL has created a study group to determine what to do with the current HF Novice frequencies which are now seldom used. Bands involved are 80, 40, 15 and 10 metres. We'll keep an eye on the conclusion and let you know their outcome.

(from Sept QST).

### WRTC-2002

The latest news is that the USA have now finalized their 10 teams and the UK have selected their one team to compete in the World Radiosport Team Championships to be held in Finland in July next year during the IARU Contest. It would be great to see an Australian Team participating. We were well represented at the '96 and '00 Championships. If you are interested in this world competition check [www.wrtc2002.org/](http://www.wrtc2002.org/)

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### Club News

## AHARS Notes

The last meeting of AHARS was addressed by Grant VK5ZWI who told us about all the changes that have taken place in the mobile phone industry within Australia since the first such phones came onto the market. There have been some massive changes and there may be some changes in the future but they will probably not be a disruptive as the change from analogue to digital (and CDMA) systems was.

Grant has been involved in the mobile phone development almost since its inception so was well qualified to give a very clear and informative talk. We all learned something new that night.

General Meetings of the AHARS are held on the third Thursday of each month and visitors are always welcomed. Please contact Geoff VK5TY or Alby VK5TAW if you are in Adelaide at that time of the month.

ar

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## Contest Calendar October–December 2001

Oct	6/7	Oceania DX Contest	(SSB)	(Sep 01)
Oct	6	European Sprint	(SSB)	
Oct	13	European Sprint	(CW)	
Oct	13/14	Oceania DX Contest	(CW)	(Sep 01)
Oct	20/21	Worked All Germany DX Contest	(CW/SSB)	
Oct	20	Asia-Pacific Sprint	(CW)	
Oct	27/28	CQ WW DX Contest	(SSB)	
Nov	1-7	HA-QRP Contest		
Nov	3/4	Spring VHF Field Day		(Oct 01)
Nov	4	High Speed Club CW Contest		
Nov	9-11	Japan International DX Contest	(SSB)	
Nov	10/11	WAE RTTY Contest		
Nov	10/11	OK/OM DX Contest	(CW)	
Nov	17/18	LZ DX Contest	(CW)	
Nov	17/18	All Austrian 160m DX Contest	(CW)	
Nov	17/18	IARU 160m Contest	(CW)	
Nov	24/25	CQ WW DX Contest	(CW)	
Nov	24/25	CQ WW SWL Challenge	(CW)	
Dec	8-9	ARRL 10 Metres Contest	(CW/SSB)	
Dec	15	OK RTTY Contest		
Dec	15-16	Croatian CW Contest		
Dec	15-16	International Naval Activity	(CW/SSB)	
Dec	26	Ross Hull Memorial VHF Contest begins	(CW/SSB/FM)	(to Jan 13, 2002)
Dec	29	RAC Canada Winter Contest	(CW/SSB)	
Dec	29	16 <sup>th</sup> Internet CW Sprint Contest		
Dec	29-30	Original QRP Contest	(CW)	
Dec	29-30	Stew Perry 160 Metres Distance Challenge	(CW)	
Jan	12/13	Summer VHF Field Day		

### Greetings to all readers.

I hope that your station is standing up well and that all is ready for the Oceania DX Contest about the time that you read this.

I urge you all to be careful about checking your logs before sending them away. It is easy to make mistakes of interpretation in scoring systems (*will we ever have the perfect wording?*), but please be vigilant about typing and arithmetical rectitude.

Also, please do not forget your name and address, even if you are sending your entry via e-mail.

I mention these points because there have been logs arrive for contests that have not always fulfilled all entry requirements. I confess to being guilty in one instance by not splitting my entry into separate logs for CW and Phone – hence my log was rejected, and rightly so.

### Log Checking

These days most logs for larger contests are checked by computers, hence the growing popularity of submission by e-mail and the American Cabrillo format. Probably this method of checking is not so widespread in Australia, but I think it is good to see an increased use of e-mail for log submissions. I would urge you all to make use of modern technology, as it is not something to be afraid of, but rather yet another aid to plying our hobby.

### Results

By now I had hoped that you would see the results of two of this year's local contests; however, there has been a slight delay.

In saying thank you to the managers of these events, I would draw your attention to the very small number of entries in the Novice Contest.

Our sincere thanks to all those who took part and submitted their logs, but by any standards this is most disheartening for the Westlakes Club which supports the event, and the Manager who finds himself with little to do. Contrary to many peoples' feelings, Managers do like to have lots of entries, for they see who supports their contest.

In contrast to the Novice Contest, the Manager told me that Westlakes runs a CQ Repeater Contest around Christmas which can generate 50 or 60 logs! Any thoughts on how contesting in Australia can be enlivened will be most welcome.

### Summer Contests

Summer will soon be with us again (and that wretched Summer Time to upset us all), but by no means does that mean that Australian contests now knock off for the year. Please check your station for the

VHF events listed in the Calendar. These can be quite interesting, especially if you have time to go to a good high vantage point for a while whilst the family goes walking.

Have you thought of operating from the car or a van in a field day, or even just an hour or so each day whilst on holidays? It really is another perspective on ham operations, and will show you some techniques of setting up that you may not really have tried before.

The Ross Hull Memorial VHF Contest is an excellent opportunity to try something like this. Give it a go! Also, the Spring and Summer Field Days make a good opportunity to get out of the shack and try a park, or high hill somewhere for a few hours. Look forward to hearing you!

Good contesting and 73, Ian Gossil VK3VP

## Spring VHF-UHF Field Day 2001

John Martin (VK3KWA), contest manager

The next Spring VHF-UHF Field Day will take place on the weekend of November 3 and 4, 2001.

I have not made any rule changes this time but I would appreciate your comments on several questions:

1. The 6 hour single operator section is now far more popular than the 24 hour section. Should the 24 hour section be dropped, reduced to say 12 hours, or left as it is?
2. Should there be a six hour section for multiple operator stations?
3. Lately the biggest scores have gone to grid-hopping ("rover") stations because of the bonus points for each square activated. It is possible to win the contest with a comparatively small number of contacts as long as you stay on the move. Should the locator grid points be reduced, or are you happy with the existing scoring?

I have only received a few comments on these points so far, and they have fallen equally on both sides of the fence. So over to you - please include some comments with your log.

### Dates

November 3 and 4, 2001. Duration in all call areas other than VK6: 0100 UTC Saturday to 0100 UTC Sunday. Duration in VK6 only: 0400 UTC Saturday to 0400 UTC Sunday.

### Sections

- A: Portable station, single operator, 24 hours.
- B: Portable station, single operator, any 6 consecutive hours.
- C: Portable station, multiple operator, 24 hours.
- D: Home station, 24 hours.

Single operator stations may enter both Section A and Section B. If the winner of Section A has also entered Section B, his log will be excluded from Section B.

If two operators set up a joint station, they may enter Section C under a single callsign, or sections A/B under separate callsigns. If they enter Sections A or B, they may not claim contacts with each other. Stations with more than two operators must enter Section C.

### General Rules

One callsign per station. Operators of stations in Section C may not make contest exchanges using callsigns other than the club or group callsign. Operation may be from any location, or from more than one location. You may work stations within your own locator square.

A station is portable only if all of its equipment, including antennas, is transported to a location which is not the normal location of any amateur station.

Repeater, satellite and crossband contacts are not permitted. No contest operation is allowed below 50.150 MHz. Recognised DX calling frequencies must not be used for any contest activity. Suggested procedure is to call on X.150 on each band, and QSY up.

### Contest Exchange

RS (or RST) reports, a serial number, and your four digit Maidenhead locator.

### Repeat Contacts

Stations may be worked again on each band after three hours. If the station is moved to a new location in a different locator square, repeat contacts may be made immediately. If the station moves back into the previous locator square, the three hour limit still applies to stations worked from that square.

### Scoring

For each band, score 10 points for each locator square in which your station operates, plus 10 points for each locator square worked, plus 1 point per contact. Multiply the total by the band multiplier as follows:

6 m	2 m	70 cm	23 cm	Higher
x1	x3	x5	x8	x10

Then total the scores for all bands.

### Scoring Table

You can obtain a cover sheet and scoring table, ready to print out and fill in, from the e-mail address given below. Otherwise please follow the following format. In this sample the operator has operated from one locator and worked four locators on each band:

Band	Locators Activated	Locators Worked	QSOs	Multiplier	Band Total
6m	10	+40	+40	x1	=40
2m	10	+40	+30	x3	=240
70cm	10	+40	+20	x5	=350
Overall Total					=680

### Logs

For each contact: UTC time, frequency, station worked, serial numbers and locator numbers exchanged, points claimed.

The front sheet should contain the names and callsigns of all operators; postal address; station location and Maidenhead locator; the section entered; the scoring table; and a signed declaration that the contest manager's decision will be accepted as final.

### Entries

Paper logs may be posted to the Manager, Spring VHF-UHF Field Day, 3 Vernal Avenue, Mitcham, Vic 3132. Electronic logs can be e-mailed to [jmartin@xccl.net.au](mailto:jmartin@xccl.net.au).

The following formats are acceptable: ASCII text, Office 97 RTF, DOC, XLS, MDB, or PUB, or Works 99 WKS. If you use Office 2000, please save the files in Office 97 format.

Logs must be received by Monday, November 26, 2001. Early logs would be appreciated.

## Reminder: Summer Field Day, January 2002

The next Summer VHF-UHF Field Day will be held on January 12 and 13, 2002.

Alan Gibbs, VK6PG  
223 Crimea Street, NORANDA WA 6062  
Email: vk6pg@tpg.com.au



## Part 7 HTML

Thousands of Radio Amateurs have developed their own Internet Web Sites for pleasure, or to promote a particular AR interest amongst a much wider audience. These amateur "Webmasters" offer free software, file downloads, tips and advice, links to other places of interest on the Internet and much more. They each contribute to the AR richness of the Internet.

### Web Space

A typical "account" with an Internet Service provider usually includes about 10MB of hard drive space on your ISP Internet server. This means that you can store hundreds of files on the ISP server for other Internet users to see, and interact with at their leisure. Each of these files is called "pages" which can include pictures, animated motion graphics, and of course the written words. It can easily be done in brilliant colour at virtually no cost to the designer.

### MS FrontPage Express

The Windows 98 CD-ROM comes with FrontPage Express free of charge, and is a first class program to use for designing your own Web Pages. If you can use a regular word-processor like MS Word, then you will find FrontPage Express just as easy to use.

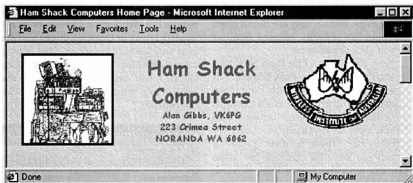
The computer language used to compile pages is called **Hypertext Markup Language (HTML)**, and requires a myriad of special computer code (called tags) to complete the pages ready for uploading into your ISP server. As an example, open any Web Page in your browser and select **View**, then **HTML**. You would be confronted with a huge list of complex HTML tags – enough to frighten the newcomer to Web Page development.

Well, help is at hand without knowing any of the HTML jargon by using

Microsoft FrontPage Express (FPE). It's like a word processor that automatically inserts all the HTML tags for you.

FPE is a "what-you-see-is-what-you-get" (WYSIWYG) when the page is saved then viewed in Netscape or Microsoft Explorer.

The writer has set up a small Web Site especially for **Ham Shack Computers**, being a simplified example of how this is done. For readers already on "The Net", "click" onto the following hyperlink: <http://www2.tpg.com.au/users/vk6pg> and you will see the following screen:



Try "clicking" onto each hyperlink listed on the page to see just how versatile a very simple page can be. Next, select **View** and then **Source**. Notepad will open and display the hidden HTML used to make the display in your browser look stylish and colorful. If you are serious, printout the Notepad file and use it as a guide to learning some of the basics of HTML coding.

### A Simple Exercise

Try this simple example to build your very first Home Page. Open up a new document using Notepad and carefully type in the following HTML commands:

```
<html>
<head>
```

```
<title>My First Home Page</title>
</head>
<center>
<body>
<h1>My First Home Page</h1>
<hr>
<h3>Welcome to my Amateur Radio
Internet Site</h3>
Here is a link to the <a href="http://
www2.tpg.com.au/users/vk6pg/">Ham
Shack Computers Home Page</a>.<p>
Thank you for visiting.
</body>
<hr>
<address>
```

```
Created: Enter the date here.<br>
Last Updated: Updated on:<br>
</address>
</center>
<hr>
</html>
```

Next, Find a spare folder in **My Documents** and **Save** the new Notepad document with the name: **index.htm**

Open your browser program, select **File**, **Open File** and **Choose File**. Use the **Browser** option to locate your new **index.htm** file and **Open** the file to display your handiwork on the screen. It may look dull and plain but it does work!



## Home Brew Pages

FPE inserts the HTML commands automatically. Colorful pages with links and images are a breeze just by using some listed menu commands. The inserted HTML code is transparent to the user although you can edit the raw code if needed when doing some page trimming and fixing up small problems. If you printed out the Notepad file, with a pencil mark up the special tags, compare these common tags from viewing the Ham Shack Computers Home Page. Notice they are much more complex but they do become familiar as you gain experience.

Open FPE, select File then New and try the **Personal Home Page Wizard**. Fill in each of the boxes with your own information until the **Finish** prompt. Save the file, open your browser and check that everything is correctly displayed. Open a new page in FrontPage Express and use the same process with the Home Page Wizard. Work through each of the options at the top of the screen. Try blocking and bolding text, insert a bulleted list or numbered list. Indenting and highlighting looks good as does columns like the pages of this magazine. Cutting, copying and pasting works the same as most word-processors so you should feel quite at home with FrontPage Express. After a short while you will have developed your own style to your page. Keep the pages simple, clear and easy to read. Try adding a hyperlink to a popular site, include your own email address. Hyperlinks can be added to open other pages in your site, and you may end up with dozens of pages - where each page is rather like a chapter in a book. Include links to jump back to your Home Page to see the "menu"

again. All this without knowing or understanding HTML technology! Avoid using WebBots that are peculiar to Microsoft compatible products and don't always function correctly in Netscape or other browsers.

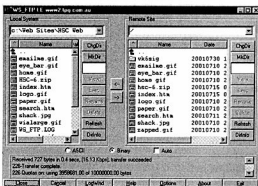
## Site Design

Once you are familiar with Web Page design, work on paper and plan the outline for your new site. It's rather like drawing the block diagram of a superhet communications receiver only easier!

Common choices and names are:

1. Home Page. index.htm
2. Links Page. links.htm
3. Search Page. search.htm
4. My Station Page. station.htm
5. Club Details. club.htm
6. Newsletter. news.htm
7. FAQ Page. faq.htm
8. Odds and Ends. oddends.htm

and so on ...  
Notice that ALL FILENAMES are in lower case and use the eight by three convention ready to upload onto a remote ISP Web Server. These servers are usually Linux or Unix machines and are case and file size sensitive. This is why most web addresses and email addresses are all lower case. Callsigns can be the exception where uppercase is the convention.



## For The "HTML Hackers"

HTML Writer by Kris Nosack (1) is a first class freeware Windows HTML Editor intended for the more experienced Web Author who likes to do some serious hacking. Authors have total control over all HTML insertion when designing

pages. Highly recommended software and a "must have".

## Uploading Pages

WS-FTP is one of the better file transfer programs, and it's freeware tool. It has two windows, on the left your own computer files and the right window displays the remote server files.

Your ISP will advise you on establishing your own server directory. Once done, the WS-FTP program "connect" menu can be set up to display the appropriate directory. Files can then be uploaded to the server by selecting the file in the left window and "clicking" the right arrow. Downloading is the same but the left arrow is used instead. It's really very simple to use. See the WS-FTP display at the bottom of this page

## Test Everything

Once you have written your pages, uploaded them to the Web Server at your ISP, test everything in Netscape and Microsoft Internet Explorer BEFORE you announce to the world that you are now on the Web. If errors are found, correct the errors, FTP again and test accordingly until everything is sweet.

## Summary

For the more experienced readers, my apologies for simplicity, but our target is to promote AR interest in the use of the Internet and not frighten away those who are willing to learn new technologies. That's the name of the game if Amateur Radio is to sustain it's long term future.

## Ham Tip No. 7

For Web Page graphics try:  
<http://www.bellsandwhistles.com/>

## Ham Shack Computers, Part 8

Beam Rotation looks at installing multiple communication ports, building and using Rotor EZ kits from Idiom Press in California. For the AR operator who thought he/she had everything, Hi

- (1). HTML Writer by Kris Nosack:  
<http://hometown.aol.com/Bottger/>
- (2). Ham Shack Computers:  
<http://www2.tpg.com.au/users/vk6pg>

73's de Alan, VK6PG  
ar

Ross Christie, VK3WAC  
19 Browns Road, Montrose 3785, Vic.  
Email [Vk3wac@aol.com](mailto:Vk3wac@aol.com)

## Psst...have you heard...?

There have been rumours doing the rounds for quite a while regarding a new amateur HF allocation at around 5 MHz in the USA.

The ARRL recently issued a news release giving details on their recent proposal to the FCC for access to a band around 5MHz for domestic use only. Apparently "the ARRL have been running an experimental station, WA2XSY, on this frequency since 1999. Their results indicate that this frequency would 'fill the propagation gap' between 80 and 40 metre amateur bands and would provide a useful emergency communications service by allowing nationwide disaster relief communications in times of disasters e.g. hurricanes etc. As a secondary measure it would also alleviate the congestion on the 80 and 40 metre bands.

The FCC has begun taking comments from amateurs and commercial users of this part of the spectrum so hopefully the wheels of government have at least begun to revolve. The ARRL's proposal suggests a 150 kHz band (5250 - 5400 kHz) where operation of CW, phone, data, image and RTTY be allowed. If the band is eventually allocated on a secondary basis then US amateurs will have to contend with interference etc from commercial and industrial users as they currently do on the 30 metre band. This is good news and would be the first new HF allocation since the 'new' WARC bands were introduced in the nineteen eighties. Maybe we should be petitioning our ACA for a similar allocation? For some time now most European countries and New Zealand have had access to a LF band while we in VK have, so far, missed out. Are we falling behind in the allocation stakes?

## Electronic QSLs

I received an email from Ken Fuller, VK4KF regarding electronic QSL cards. He asks why a system for Internet delivery of QSL cards has not been established. Ken says that it would be much cheaper, quicker and more efficient than via post or the bureau (it

would also free up a good number of QSL bureau volunteers!). I made a few inquiries and found that there are a few electronic QSL card programs around, eQSL etc, all offering various features. However, unfortunately none of them are recognised for award purposes, such as DXCC.

But, after sending off a reply to Ken, I found out that there is a scheme currently under development that has the approval of the ARRL and eventually should meet the scrutiny of most other award authorities. It is called 'Logbook of the World' (LOTW) and it has recently been given the approval of the ARRL board of directors. In a recent ARRL News release, that also included a simple description of the project, the software development team say they hope to have the system up and running by mid 2002. Software will soon be released to logging software writers to incorporate into their newest versions for evaluation purposes. Most importantly, LOTW has been designed to be secure and to minimise or eliminate bogus claims. If you want more information on LOTW have a look at <http://www.sourceforge.net/projects/trustedqsl> or contact Wayne Mills, N7NG. The LOTW sounds like good news for those of us who gather awards, it may also prove to be the first stepping stone towards a 'reliable electronic QSL bureau' for exchanging QSLs between average operators.

October sees JOTA weekend again. This is a fun event and the scouts, guides etc have a great time on the air having a nervous and shaky chin-wag with their like minded peers. If you hear them on air give them a quick call, it helps out the volunteer operators as well.

## The DX

**3B8, MAURITIUS.** Jose, ON4LAC says he will be active from Mauritius Island (AF-049) between the 16<sup>th</sup> of October and

the 6<sup>th</sup> of December 2001 as 3B8/ON4LAC. He will be using SSB and possibly Pactor and RTTY. QSL direct only to ON4LAC. [TNX ON4LAC and 425 DX News]

**5W, SAMOA ISLANDS.** Atsu, J13WLT/5W1SA is heading back to Apia in the Samoa Islands (OC-09C) for two years beginning the 22<sup>nd</sup> of August 2001. QSL via JH7OHF. [TNX J13WLT and The Daily DX]

**8Q, MALDIVES.** Pierre, HB9QQ will be active as 8Q7QQ from Gan Island, Maldives (AS-013) beginning the 31<sup>st</sup> of Oct until the 12<sup>th</sup> of November. He intends to concentrate on 6 metres this trip but HF action will also take place. He will run a beacon on 50.098 MHz, so have a listen and you might be surprised. QSL via HB9QQ either direct or via the bureau. [TNX OZ6OM and 425 DX News]

**FR/T, TROMELIN.** Jack, FR5ZU, is travelling to the islands weather station and expects to be there from the 6<sup>th</sup> of Sept until the 5<sup>th</sup> of Oct. Activity will be on SSB running 100 watts to vertical antennas. Jack suggests trying around the following frequencies; 3773, 3795, 14256, 14274, 18145, 21205, 24945 and 28470 kHz. QSL via JA8FCG. [TNX FR5ZU and OPDX]

**TI, COSTA RICA.** Bill, AK0A, will be operating from the QTH of Henry, TI2HMG using the callsign TI2/AK0A. Activity will run from the 25<sup>th</sup> of Sept until the 9<sup>th</sup> of Oct. He hopes to be active on all bands using RTTY, PSK, MFSK, CW and SSB in that order. QSL via his home callsign via the W0 Bureau. [TNX AK0A and OPDX]

**V6, MICRONESIA.** Sho, JA7HMZ and Hisa, 7L4IOU are heading to Pohnpei Island (OC-010) for a Digital mode DXpedition beginning on the 28<sup>th</sup> of Sept until the 4<sup>th</sup> of Oct. They intend to run RTTY, SSTV and PSK31. Their callsigns will be Sho, V63DX and Hisa, V63XC. QSL direct via their home callsigns:

JA7HMZ-Shoji Igawa, 17 Shirogane, Yokobori, Ogachi, 019-0204 JAPAN and 7L4IOU-Hisami Dejima, 2-11-13 Minamikoikiwa, Tokyo, 133-0056 JAPAN. The pair also intend to participate in the CQWW RTTY CONTEST as V63XA. The QSL route for this call is via JA7AO: Tokuro Matsumoto, 3-62 Okachimachi, Yuzawa, 012-0856 JAPAN. [TNX JA7HMZ, 7L4IOU and OPDX]

**V7, MARSHALL ISLAND.** Jeff, KA1GJ, will be on Kwajalein Island, RMI (V73) for a three year assignment. He does not know exactly when he will arrive but it will be soon. His call will be V73GJ. [TNX KA1GJ and OPDX]

**VK9, NORFOLK ISLAND (OC-005).** Wojtek, SP9PT and Jerzy, SP9EVP will be active from here beginning on the 20<sup>th</sup> of Oct until the 4<sup>th</sup> of Nov. They will be on all bands using CW, SSB and RTTY. Callsigns will be VK9KNE and VK9KND. [TNX SP9EVP and 425 DX News]

**VP8, SOUTH GEORGIA** (see Round Up). Mike, GM0HCQ is heading back to South Georgia (VP8) with a possible trip to South Orkney (VP8) as well. From the 10<sup>th</sup> of October he will be on the air from aboard the Royal Research Ship Ernest Shackleton using GM0HCQ/MM. Once the ship reaches Falkland waters he intends to use the call VP8CMH/MM. Mike has supplied two Internet addresses for those who want further details of his trip, visit <http://www.qsl.net/gm0hcq> for his itinerary and <http://www.hfdx.co.uk> once he is underway. QSL direct to Mike Gloistein, 27 Stormont Way, Scone, PH2 6SP, Scotland. [TNX GM0HCQ and The Daily DX]

**XP, GREENLAND (OX).** The callsign XP1AB will be heard once again on the air. This call has not been heard since the 1960's and a group of Danish operators plan to activate it again from Sondrestrom on the west coast of Greenland during the CQWW SSB Contest. The contest runs over the weekend of the 27<sup>th</sup> and 28<sup>th</sup> of October. XP1AB is in CQ zone 40, ITU Zone 5 and IOTA reference NA-018. A large group of OZ operators are planning on arriving on the 24<sup>th</sup> of Oct. They will be assembling the equipment together for the first few days getting ready for the contest on the weekend. After the contest, if they have time, they intend to operate with their own calls/OX on all HF bands and 6 metres. They may be active on CW before and/or after the

contest depending on the time available. The group expects to leave Greenland on the 31<sup>st</sup> of October. Jorgen, OZ0J comments 'during the OX2K DXpedition in May June 2000 we have put up an operating room to be use radio amateurs all over the world. We have also made a local club up there and the call sign will be XP1AB'. Good on them and we should all thank them for the opportunity to work this rare call area. The QSL Manager is OZ1ACB and QSL is direct only to OZ1ACB. See at <http://www.qsl.net/ox2k> for more information or Email Jorgen, OZ0J, at [xp1ab@qsl.net](mailto:xp1ab@qsl.net). [TNX OZ0J, OZ1JSH, VK5UE and 425 DX News]

**XU, CAMBODIA.** Alain, F6BFH says he will be on the air as XU7ABW from the 22<sup>nd</sup> of Oct until the 10<sup>th</sup> of November. He intends to concentrate primarily on 6 metres. [TNX F6BFH and The Daily DX]

**XU, CAMBODIA.** Claude, F9LC (ex FF8AK) has retired and has taken up residence in Phnom Penh, Cambodia. He is operating under the call XU7ABN. He prefers working PSK31 and RTTY on 15 and 20 metres. QSL to Claude Laget, P.O. Box 1373 G.P.O., 99999 Phnom Penh, CAMBODIA. [TNX F9LC and The Daily DX]

**YI, IRAQ.** G0TLC hopes to back in Iraq by late September and will be active as YI1BGD. He will be using the club station in Baghdad. He hopes to be on the air at approx. 1400Z on various bands including WARC, 6 metres is a possibility as well. The QSL route for QSOs with G0TLC is only via G0MMI. [TNX G0TLC and The Daily DX]

**YM, TURKEY.** Mill, LX1CC will be active as YM3CC from the 16<sup>th</sup> of Sept until the 6<sup>th</sup> of Oct. He will be using SSB on all bands including WARC. QSL via his home call. [TNX LX1CC and OPDX]

**ZZ, ZIMBABWE** (QRP Safari Op). Harry, W6DXO, thanks the Zimbabwe Amateur Radio Society for their courtesy in helping him organise his operation as Z2/W6DXO. He will be active from the Linkwasha Wilderness Camp and the Victoria Falls Hotel from the 27<sup>th</sup> of Sept until the 5<sup>th</sup> of Oct. He says working conditions will be most conducive to QRP operation so don't expect big signals. Most operation will take place on 20 metres. QSL via W6DXO direct only. [TNX W6DXO and OPDX]

**ZC4, U.K. SOV. BASES AREAS ON CYPRUS.** Steve, ZC4BS expects to

remain here for another year or so. He is active on all bands 160 – 10 metres and all modes, but says most of his activity takes place on the 15 and 20 metre bands. [TNX ZC4BS and OPDX]

## Special Events

The members of the Central Arizona DX Association will be running a special event operation in honour of the late Senator Barry M. Goldwater over the weekend of the 20<sup>th</sup> and 21<sup>st</sup> of October. They will operate as K7UGA on all bands 160-6 metres SSB and CW. QSL via the W7 bureau or (for the special commemorative card) direct to KC7V. Any and all proceeds from this event will go to the CADXA Scholarship fund, administered by the ARRL. Senator Barry Goldwater performed a lot of good work in the American Congress in aid of amateur radio, a pity we don't have someone like him in the Australian government to champion our cause. [TNX K8BN and 425 DX News]

## Dxpeditons

**3D2, CONWAY REEF.** Raymundo, YS1RR, says the mostly Yugoslavian team, headed by Hrane, YT1AD, expects to be back on the reef between the 1<sup>st</sup> and the 10<sup>th</sup> of October. The team will include YT1AD, YU7AV, YZ2AA, YU1AU, YU1DX, Z3ZM, RZ3AA, K1LZ and possibly YT6A. There will be two stations active on all bands 160 – 6 metres on CW, SSB and RTTY. The two stations will have separate callsigns, one for CW and the other for SSB and RTTY. The pilot stations for the event will be YU1AA and VE3EY. For more information visit <http://www.kragujevac.co.yu/3d2>. The QSL route for CW QSOs is via YT1AD, Hrane Milosevic, 36206 Vitanovac, YUGOSLAVIA while SSB and RTTY go via Z3ZAU, Dragan Kostevski, P.O. Box 35, 6000 Ohrid, MACEDONIA. [TNX YS1RR and The Daily DX]

**3DA, SWAZILAND.** A German team comprising Siegfried, DL7DF, Frank, DL7UFR, DL7KL, DL4WK will operate as 3DA0DF and 3DA0FR from Swaziland between the 30<sup>th</sup> of Sept and the 13<sup>th</sup> of Oct. They intend to be active on all HF bands plus 6 metres using CW, SSB, RTTY and PSK31. The equipment list is quite impressive with three transceivers, two linear amplifiers, beam antennas, a Titanex V80 low band



vertical plus and a variety of other antennas. Online logs will be available at <http://www.qsl.net/dl7df> as well as up to date information on the operation. QSL is via DL7DF. [TNX DF3CB, DL7DF, OPDX and 425 DX News]

**ZK1, NORTH COOK ISLAND.** The planned operation from Manihiki (OC-014), North Cooks has been confirmed. The dates of operation are from the 18<sup>th</sup> of Oct until the 1<sup>st</sup> of Nov. The operators will be Ralph, VE7XF/ZK1AKX; John, AA7PM/ZK1APM; Bob, W7TSQ/ZK1ASQ; Roger, W7VV/ZK1VVV; Victor, ZK1CG and Tuatai, ZK1MA/ZK1CY. They will take part CQ WW SSB DX Contest as ZK1CG. After the contest the team will travel to Rarotonga (OC-013), South Cooks and operate from the 1<sup>st</sup> until the 13<sup>th</sup> of Nov. Activity from both sites is expected on all bands from 160 – 2 metres (except 30 metres) on CW and SSB. [TNX The Daily DX and 425 DX News]

**GJ, JERSEY ISLANDS.** Chris, G0WFH, intends to make a last trip to Jersey using the call GH4BJC/P over the period of the 17<sup>th</sup> until the 31<sup>st</sup> of Oct. He will concentrate on 160 metres SSB. His scheduled operating times are as follows:

Oct 18, 23:00–03:00z  
Oct 21, 19:00–24:00z  
Oct 22, 23:00–05:00z  
Oct 27, 23:00–06:00z  
Oct 28, 22:00–04:00z  
Oct 29, 22:00–02:00z

Chris advises that if operating times extend beyond 24:00z / 00:00z then the ending time is on the following calendar day. The equipment will be an Icom IC-756, ALS500M 400W amplifier, 160/80m vertical ("Battle Creek special"). Batteries, a charger and a generator will provide power. If you want a sked then contact Chris at [chris.g0wfh@btinternet.com](mailto:chris.g0wfh@btinternet.com). [TNX G0WFH and The Daily DX]

**9G, GHANA.** Dick K5AND; Arliss, W7XU and Ed, W0SD are travelling to Ghana, West Africa. The team will be active from Elmina, approximately 100km southwest of Accra. Elmina is on the coast so this should be an aid propagation. Maidenhead Grid square is IJ95. Equipment will comprise two FT-100D's, a 3CX800 amp, a 7element (27 foot long boom) beam and a 25 foot rotating mast. We will also have HF equipment (100 watts) for 28.885 /

14.345 and a beacon-mode keyer etc running. QSL details to be finalised. [TNX K5AND and OZ50MHz Bulletin]

## Round Up

A note from Chris Wright, VK2UW, and Karen Wright, VK2HKW, letting us know of their **Pacific DX Net** that runs on 14240 kHz +/- QRM from 11:00 UTC until either conditions or the net controllers decide to call it quits. Chris and Karen say DX stations will have preference over regular / local stations and that there are lots of new DX stations and rare islands logging onto the net while others are always encouraged to join the net. They have also enlisted the help of Doc, AF4MI, who acts as net controller on the far side of the Pacific if conditions or propagation deteriorate. [TNX VK2UW and VK2HKW]

Mike, GM0HCQ, plans to be back in the South Atlantic for a period of time late this year and early next year. He plans to operate as **VP8SGK** from King Edward Point, Cumberland Bay West, **South Georgia** and as **VP8SIG** from Factory Cove, Borge Bay, Signy Island, **South Orkney Islands**. Dates for both calls are as follows;

VP8SGK	November 24–30 2001
	January 10–11 2002
	March 4–6 2002
VP8SIG	November 17–22 2001
	January 5–8 2002
	January 28–30 2002
	February 27 until
	March 2 2002

Keep an eye on <http://www.qsl.net/gm0hcq/vp8sgk.htm> for the latest word. [TNX GM0HCQ and The Daily DX]

**TT, CHAD.** Chris, TT6DX has just returned to Moudoun in southern Chad after holidaying in France. He plans to be active from here (grid square JF88aa) for another year. Equipment includes and HF transceiver with dipoles for 10, 12, 15, 17 and 20 metres, an HFV2 for 30, 40 and 80 metres and an AL-1500 amplifier. For 6 metres Chris will use a transceiver / amplifier combination providing about 400 watt to a 2-element HB9CV. QSL via F5OGL either via the French REF bureau or direct to Didier A. Senmartin, P.O. Box 19, F-35998 Rennes Armees, FRANCE. [TNX TT8DX and The Daily DX]

**T30, WESTERN KIRIBATI.** Eric, N1JSY is a member of the Peace Corp and will be active as T30ES from

Butaritari Island during his off duty hours. Eric is kept very busy during the day as he is involved with a variety of local projects, e.g. developing the country's infrastructure, providing assistance to the people in a number of areas such as rain water collection, women's medical issues and being an advisor to the school's gardening club. However, thanks to the help of the Candlewood Amateur Radio Association (CARA) in Connecticut, Eric has access to a TS-430 (100 watt) and two G5RV antennas positioned separately, for 80-10 metres. Power is primarily supplied from batteries charged from a solar collector so power is extremely limited. He will operate for a few hours each day using a car battery in his hut (this is recharged during the day). As Eric is new to HF and DX operations CARA members will help by providing Net Control assistance and as a QSL manager for his operation. For those who are lucky enough to work Eric a QSL can be sent to W1QL: C.A.R.A., Post Office Box 3441, Danbury, CT 06813 U.S.A. An Internet site is available at <http://people.mags.net/boem/kiribat1.htm> for up to the minute information. [TNX N1JSY, KZ1Z and OPDX]

A station has been heard recently signing 3A0FC and calling himself Mike, G4IUF and giving Mike's callsign as QSL info. **This is definitely a pirate, Mike adds "I have never been to 3A, and this guy has been giving me grief for years".** [TNX G4IUF and 425 DX News]

Band conditions are beginning to improve and there is a lot of DX and Expeditions available so don't let them waste their time, get on the air and give them a call.

## Sources

There is a lot of interesting information in this months edition of DX Notes and as always our thanks go to those stations, organisations and publications that make it all possible. These include ON4LAC, J33WLT, OZ6OM, FR5ZU, AK0A, JA7HMZ, 7L4IOU, SP9EVP, GM0HCQ, OZ0J, OZ1JSH, VK5UE, F6BFF, F9LC, G0TLC, LX1CC, W6DXO, K8BN, YS1RR, DF3CB, DL7DF, PA7DX, K5AND, ZC4BS, TT8DX, N1JSY, KZ1Z, VK2HKW, VK2UW, G4IUF, OZ50MHz Bulletin, The Daily DX, 425 DX News and OPDX

## Repeater Link

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## User pays

The past year has seen a trend towards many repeater sites costing us a lot more in access fees. Repeater managers are receiving requests for payment at sites we share with commercial and Government organisations that are just not sustainable.

There appears to be a fundamental shift on the way all users on repeater sites are being charged, and that being to up the fees by as much as ten times. In VK2, fee charges in the thousands per site per year have been requested. Repeater groups are endeavouring to negotiate these costs down to what amateurs can afford to pay. If this proves unsuccessful then the sites may well have to be abandoned.

In VK6, one such site that we have had a two metre repeater on for almost twenty years, received a request for payment per year of almost ten times what is being paid now. Unless this figure can be reduced substantially, other alternatives will have to be looked at. This could well lead to the repeater closing down for good.

I believe that VK3 could well be in a better situation, due to the status of their repeater networks having some standing with the civil emergency organisations, but this may or may not have any value for the rest of Australia.

It could well be that the owners of sites like this are unaware of amateur usage

and that no income is derived from such repeaters, but we will have to wait and see. This move to increasing the site rental is of considerable concern and perhaps should be tackled on a national front rather than each repeater group being forced to defend their costs on a stand-alone basis.

## Computers Again

It has been a while since I have had a whinge about computers, but it does one good to get the odd story told. This one involved fitting a network card. All went smoothly, loading the drivers from the supplied floppy, until the computer asked for the Windows 98 CD. Well as it happened I did not have the Windows 98 disk with me so the only option was to hit the cancel button. Big mistake. On re booting the computer, all sorts of files were missing, along with much of the computer's basic set up. In fact after several re-boots the computer did not function well at all.

Now this begs a question or two. Would you not think that a cancel button means just that, cancel, not "if you select this option your computer will be screwed up." Perhaps the software developers never actually tried the cancel button but all options should be tried, it is called software testing.

The only way out was to reformat the hard drive and start again. Armed with the Windows 98 CD all went well this time. Be warned of the cancel button when installing a network card.

## Printer Cartridges

And yet another computer story, re-inventing printer cartridges. The purchase of a new printer and the inevitable need to replace the expensive ink cartridges leaves you wondering why the cartridges are a third of the total price of the new printer. One could even come to the conclusion that printer cartridges are a

rip off, as re inking can be done at a fraction of the cost of new cartridges.

Despite all the warnings from the printer manufacturers, that re inking can lead to all sorts of problems, a friend had been re inking his printer for about two years with no problems and a saving of almost \$1,000. Any problems that re inking may cause can be off set by just buying a new printer with a saving like that.

However my printer is lot smarter at frustrating the re inking process. The near empty cartridges were re inked, but the computer reported the ink was still low and would not allow the printer to print. All efforts like leaving the printer over night and re booting would not change the situation; the printer reported low ink and would not print.

A phone call to the retailers of the ink explained all, well in part at least. The print cartridges contain a smart chip that monitors the ink as it goes down. If the cartridge is re filled at any point the chip ignores the extra ink. As far as the cartridge is concerned the ink can only go down not up. I don't know if the chip simply reports the lowest point and only continues reading any lower level once the replaced ink has been used down to the same point. However if the ink reaches the no ink level the printer will not work, and refilling the cartridge will not work. But there is a software program that you can download from the Internet that re sets the chip in the cartridge. The ink suppliers forgot to tell me this. Running the program worked, and the cartridges now show a full ink level and the printer works.

I'm sure the printer manufacturers are working on an even smarter chip to prevent re inking of printer cartridges. I can't help but feel this is unfair, particularly as re inking of printer cartridges, at a considerable saving works, despite all the warnings from the printer manufacturers.

## New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of AUGUST 2001

L31558	MS J MCDONELL
L31559	MR P HANAFIE
L31560	MR W QUAYLE
VK2XES	MR D E CURRY
VK3KEV	MR K DUNHAM
VK3LCW	MR C WILKINSON
VK3TEB	MR T BUTTERFIELD
VK3XJL	MR J P LONGWORTH
VK3ZYU	MR P B SIMONS
VK5AAW	MR L E GEERING
VK5ATT	MR K R DE VORE
VK6IG	MR G E WATTS
VK6SA	REV M G SUTER
VK7KRR	MR R E RICHARDS
VK7ZBB	MR B BASSTIAN

David K Minchin VK5KK

Postal 10 Harvey Cres, Salisbury Heights, SA, 5109

E-mail: [tecknolt@arcom.com.au](mailto:tecknolt@arcom.com.au)

Web page: <http://members.ozemail.com.au/~tecknolt>

Fax +61 8 82924501 NEW FAX NUMBER

Phone 0403 368 066 AH ONLY

All times are in UTC.

## WSJT Meteor Scatter Software

Ian VK3AXH reports, "Having now had some very recent success with WSJT (a meteor scatter program) has prompted me to seek comment from reflector members and others regarding a suitable frequency for this mode of operation. This morning whilst tuning around two metres I heard this program running and promptly sent a reply during the off period, which proved to be successful. This subsequently led to an SSB contact where the frequency issue was raised.

Having been involved in early beta testing of the software and following the comments on the MS Reflector it seems that hams in the USA and Europe are making big gains with grid square numbers by using this program. So all you grid square hounds should get fired up to improve your numbers!

It might also be useful to include this activity prior to, during or after the Wednesday night 144.150 MHz SSB net held in VK3 and run by Rob VK3EK. If this idea sounds good it may help overcome some of the frustration some hams experience when attempting QSO's over long distances i.e. VK3 to VK2 and VK4. It would also enable contacts to be made for those hams not normally able to make contacts via aircraft enhancement.

For those not familiar with the program it is available from <http://pulsar.princeton.edu/~joe/K1JT>. The author Joe Taylor reports that good 6 and 2 metre contacts have been made using MS over 800 to 2200km on bands that had been reported "dead". If some consensus can be reached albeit by gentleman's agreement, perhaps a submission made to the WIA bandplan group for recognition. I hope I have not overlooked an existing designated frequency for this activity.

Those who I know that have the program running are VK3's AUU, CJS, KQB, AXH and VK4AKM. There are bound to be many others as well"... Ian VK3AXH.

## Two Metre Activities in Singapore

From Jaya 9V1VS editor of Singapore "Groundwave" publication, as reported in the West Australian VHF Group September 2001 Bulletin. The following is an excerpt from the letter "Almost all traffic on 2m in Singapore is FM, with a rare Packet access to a packet BBS. The only SSB traffic is from satellite users. All mode 2m transceivers are very expensive compared to FM rigs. One way out is perhaps by using transverters. The power limitations for terrestrial and satellite operations are different. For terrestrial we are limited to 10 watts E.R.P. (!). Some of the personalities in the licensing authority were of the opinion that 2m band is for local communication and not DX! Also they seem to be oblivious of the effect of Sporadic E on 6m communications. Hence, it may not be easy to obtain permission of multi band transceivers that include 6m in their range of frequency bands. So the IC706 and similar rigs are not approved.

There are two 2m repeaters on 144.625 and 145.625 MHz. The inputs are -600 kHz. Several kilometres to the north there is a Malaysian repeater on 145.725 MHz with a call sign 9M2RGP and fitted with CW ID and power output of 25 watts. 9M2RGP is sited atop a hill, Gunong Pulau, on which there are a number of antenna's. It is near Senai Airport in Johor. I can copy the repeater with a handheld from my QTH on the East coast of Singapore.

We have never, to my knowledge approached the licensing authority for a license for a beacon. We are permitted 144 to 146 MHz. There are non-amateurs in YB-land operating from 137 - 160 MHz. So you may hear them on FM mode chatting non-stop!"

## Up coming 24 GHz EME activity

From Barry VE4MA .... Al Ward W5LUA & VE4MA are planning a period of 24 GHz EME activity that will permit other stations to listen and hopefully even result in new contacts (WA7CJO & AA6WI7).

We are planning to use 2.5 minute sequencing for the following skeds:

October 9 @07:00 W5LUA-VE4MA  
24192.100

October 10 @ 08:00 W5LUA-VE4MA  
24192.100

The choice of these dates was made to avoid the contest weekend and give a good visual moon for tracking. With visual tracking, we hope to avoid the usual 10 GHz practice of pausing at the 1-minute point in a sequence for antenna peaking.

Al and I are within 5 kHz of agreement on the frequency, but we will keep our echoes close together. The Doppler shift can be very high (up to 70 kHz) so please be aware that there are dramatic differences in the calculated Doppler between the various programs. Al & I are both using W9IP's "Realtrack"... Barry VE4MA

Emil Pocock W3EP reports in his "World above 50 MHz column in QST" ....VE4MA used a 2.8-metre offset dish, a 1.6 dB noise figure receiver, and 70W from a Varian traveling wave tube (TWT) amplifier in the shack. Feed was accomplished via a wave-guide. W5LUA had a 3-metre prime focus dish, a 1.75 dB noise figure receiver, and a Thompson TWT that delivered 80W to the feed horn.

WA7CJO and AA6IW are close to finishing their EME-capable 24 GHz stations, and others in Europe, including CT1DMK and G3WDG, have receive capabilities. Nevertheless, it is unlikely that 24 GHz EME will become popular very soon. Water-vapor absorption losses are significant at 24 GHz, and the technical challenges involved in

generating sufficient power to overcome atmospheric attenuation will probably limit the number of amateurs willing and able to duplicate this feat, at least in the near future. The best locations for 24 GHz EME might turn out to be high deserts, arctic regions and other areas of the world where atmospheric moisture is generally low. ... Emil Pocock, W3EP.

## Microwave Primer Part Seventeen:

### Packaging the Portable Microwave Station

Last month we looked at considerations for packaging the various modules and the combined station. This month we will look at the portable dish, tripod and engineering frequency considerations.

What may seem to be a trivial issue at first, is not. The way in which you package the "portable" station can either make a very usable system or a very hard to use system. The ability to transport and then quickly deploy a station is important when propagation can appear or disappear in a very short time. Waterproofing is required, to some degree, as climate conditions on hills from 300 - 1000 metres can change quickly! And to be able to take a fair amount of bouncing around in the back of a vehicle yet still work on frequency first time is most important.

There are many ways to arrange a station; the first picture shows a number of 3GHz to 24 GHz portable stations built by various VK3 & VK5 microwave enthusiasts. All have similar layouts using old surveyor tripods and 600mm diameter prime focus dishes. Almost all

use a system where the tripod is attached to a base plate or frame, which supports the chassis of the transverter. The dish is then attached to the front of this arrangement. The feed is then attached via semi rigid coax or waveguide via a central connector.

The fact that Russell VK3ZQB's two closest units look almost identical is no co-incidence. Both units use the same frames so the transverter and feed components are interchangeable for 3, 5 & 10 GHz. This makes quick band changes possible using a common dish/frame/tripod. This reduces the amount of equipment to be carried around by more than 50%. The type of transverter chassis has been touched on before but perhaps a comment on the size is relevant at this point. Allow more than adequate room around all modules so the unit is serviceable. Again, if you are planning to build more than one band, some commonality between units will save time.

When I started making my current batch of transverters, in 1990, I settled on Horwood style boxes (150 or 200 mm wide, 75 mm high, 250 mm deep). Many of the transverter kits developed for the ESC were designed to go into these boxes. These transverters were all 100mW - 500mW output. All had similar layouts and had ample room for the current, at the time, developed modules. My 10 GHz 1 watt transverter, contained in a 75 x 150 x 250mm box, is quite compact!

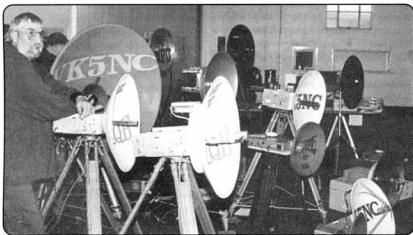
The major problem that appeared when upgrading the boxes a few years later, with new Power Amplifier's (1 - 10Watts) and pre-amps, was room. I have

now made the conscious decision to start with a new (larger) formatted box. Rather than cannibalize the old transverters I am building new ones. I have updated minor aspects of the old transverters (lower noise Rx and frequency stability) so they can be lent out. As a recommendation, for a typical Microwave 1 - 10W transverter, a box around 300 x 300 x 100mm is recommended. The box can have a dividing partition but should have both top and bottom access.

It is possible to build more than one band into a single box making dual band operation only a matter of changing the dish feed. Alternatively, if you use a dual band feed and a relay, you can change bands by simply flicking a switch! Dual band feed designs exist for 2/3 GHz, 3/5 GHz and 5/10 GHz. A word of warning some earlier design multi-band feeds have been found to be good as dummy loads and not much else! The best designs are dual mode can type feeds with separate feed points. The popular triband PCB design in QST years ago is OK on 2 & 3 GHz but has been found to be poor on 5 GHz. In all cases, a single band feed will always outperform a multiband unit.

In earlier parts, mention was made of using Offset feed type dishes, as typically used with K-band satellite units (Foxtel, Optus, etc). Mechanically they are harder to arrange but the plus is the increased efficiency for the same size dish. The most common approach is to mount the entire dish assembly at the balance point of the feed support tube, above the transverter box. The feed is then about 300mm max in front of the transverter. The system ends up being quite a bit taller than a prime focus dish system but at least the centre of gravity is over the pivot point. The other challenge is to accurately allow for the offset by tilting the dish down by 26 - 30 degrees. Please refer to earlier parts for various methods to find the horizon.

The last issue is keeping the dish and tripod standing! The sail area of a dish is substantial enough that in a 16 km/h or higher wind, things will start to move. I use a short piece of rope tied around a loop at the apex of the tripod. The other end of the rope is usually tied around a 12V 40 Ah battery directly underneath the tripod! The other method is to use tent pegs (big ones!) at each tripod leg. Cable ties looped around each leg



Russell VK3ZQB with a collection microwave systems!

provide a quick means of tensioning up the pegs. The other alternative is to attach the tripod to a fence or other piece of structure that may be available. A dish blowing over in wind is not fun. Usually the equipment survives, but the dish gets bent and coax and DC leads are stretched. Panel beating a 10 GHz dish in the field usually doesn't guarantee restoration of full performance!

All the ancillary equipment like transceivers and DC power can be contained in another box for easy transport. The second illustration shows VK5KK's portable IF box, previously described. The box is an ex military test equipment transport box that is water and airtight when closed. It actually floats!

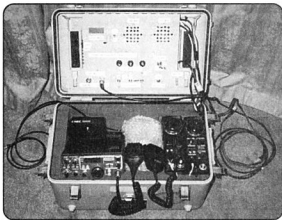
One of the transceivers is used for what is called the "engineering frequency". Invariably 144 MHz SSB is used. When you are portable, 25 watts and a 6-element beam will suffice for distances up to 400-500km with some lift. For greater distances, a bigger beam and/or more power may be needed. If the hill is a good Microwave site, it should be more than a good site for 144 MHz. However, on more than one occasion signals have been better on the

uWave band being used than 144 MHz! Importantly, if you can't talk on 144 MHz you will be traveling blind. In the SE areas of VK3/VK5 FM repeater coverage is quite good so over shorter paths the local repeater can be used. This also gets other people involved, on more than one occasion I have had curious local amateurs turn up on a portable site, as well as normal curious onlookers.

Next week we are having a complete change of pace with a look at Microwave ATV, including recent work on 10 GHz over 85km paths, home QTH to home QTH, 24 hours a day!

## In closing

I will be in the Middle East and UK in late September/Early October, so I hope to bring some extra news from the European scene for next month. Local propagation news has been limited in



VK5KK's uWave IF box with 144 & 432 MHz IF and 144 MHz SSB with internal DC Power

the last month with only limited winter tropo and few reports of 50 MHz activity other than to the North from VK4 & VK8. A reminder that the Spring Field Day will be held over the weekend of the 3<sup>rd</sup> and 4<sup>th</sup> of November, 2001.

I'll leave you with this thought, ... "Remember when the moon just affected tides, not taxes?"

ar

## Education Notes

Brenda M Edmonds VK3KT  
PO Box 445, Blackburn VIC 3130

# How basic is a basic licence?

Thank you to all those who have responded to my earlier comments about a lower level entry point to amateur radio. There does seem to be a groundswell of opinion in favour of there being a lower level.

I am at present contacting a number of other national bodies to find out the details of their lowest entry points, and the privileges offered for that level.

My personal opinion is that we are not yet ready to approach the ACA about such a licence, as we currently have five levels of licence, which is quite enough for anyone to get their head around. However, it does seem likely that after the WRC in 2003 the mandatory Morse code requirement for HF may become an option, at which time we will have only two levels of licence. That would seem an opportune time to ask for another level. But there is nothing stopping us from making plans and discussing the options before then.

If the mandatory Morse code qualification becomes optional, should we put something else in place of it? If

so, what? A speed typing test? A more detailed examination of some of the newer modes? A practical construction project? There are many possibilities. Perhaps the Morse code could remain as one of a number of options leading to an advanced licence. We need to make a detailed assessment of just where we are going and what we want to put into amateur radio as well as what we want to get out of it. We have muddled along for years with one system. A full scale review would not hurt us.

One matter which is open to discussion is the privileges which should be accorded such a licensee. Several possibilities have been canvassed, from a section of 70 cm to part or all of the HF bands. It would need to be exciting enough to encourage

activity and the further study required for upgrading.

It is assumed that a basic licence would not allow any experimentation with transmitter circuitry - in effect it would be a licence to operate a "black box" - and ancillary equipment such as antennas would need to be put up under the guidance of a more qualified person.

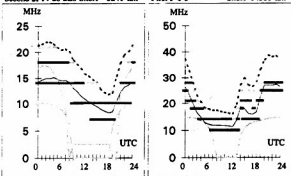
I welcome further input on this topic so that I can present a balanced report to next year's AGM.

On a totally different topic, I have reported elsewhere on the amateur radio stand at the Great Australian Science Show. One thing that stood out was the number of children fascinated with the Morse keys. We gave out more copies of the Morse code than any other handout. Is this a good sign for our future?

ar

# Adelaide-Auckland 104 Brisbane-Chicago 57

Second 2F14-20 2E0 Short 3241 km First F 0-5 Short 14361 km



October 2001

T index: 105

## Legend

Frequency scale  
Time scale

## HF Predictions

by Evan Jarman VK3JA  
34 Alandale Court Blackburn Vic 31

These graphs show the predicted diurnal variation of 1 MHz frequencies for the nominated circuits.

These frequencies as identified in the legend are:-

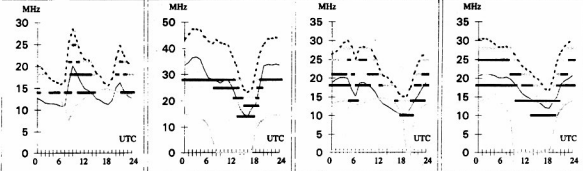
- Upper Decile (F-layer)
- F-layer Maximum Usable Frequency
- E-layer Maximum Usable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

Shown hourly are the highest frequency amateur bands ranges between these key frequencies, when usable. The propagation mode and Australian terminal bearing are also given for each circuit.

These predictions were made with the Ionospheric Prediction Service program: ASAPS Version 4

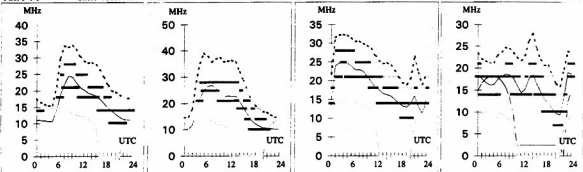
# Adelaide-London 132 Brisbane-Honolulu 49 Canberra-Dakar 214 Darwin-Christchurch 139

First F 0-5 Long 23755 km Second 3F5-11 3E0 Short 7569 km First F 0-5 Short 17361 km First 2F5-8 2E0 Short 5282 km



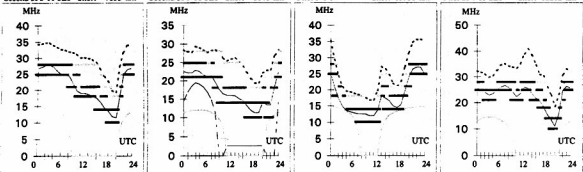
# Adelaide-London 312 Brisbane-Moscow 321 Canberra-New Delhi 303 Darwin-Manila 340

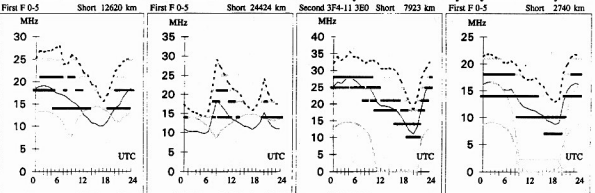
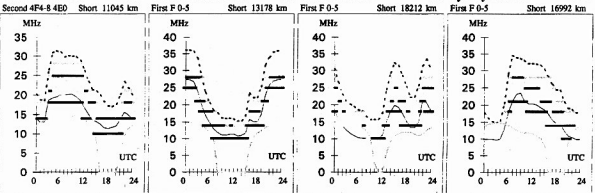
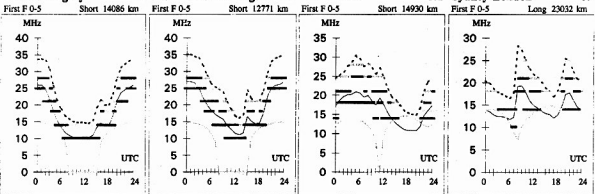
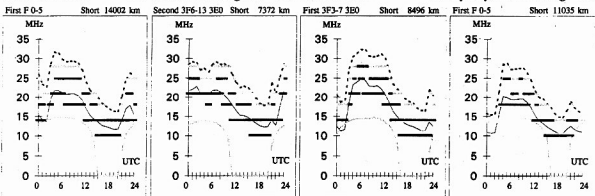
First F 0-5 Short 16269 km First F 0-5 Short 14071 km Second 4F5-11 4E0 Short 10347 km Second 2F13-27 2E2 Short 3196 km



# Adelaide-Tokyo 1 Brisbane-Singapore 293 Canberra-Washington 70 Darwin-Osaka 5

Second 3F5-11 3E0 Short 7855 km Second 3F9-16 3E0 Short 6146 km First F 0-5 Short 15938 km First 2F4-13 2E0 Short 12212 km





# HAMADS

- Hamads may be submitted by email or on the form on the reverse of your current Amateur Radio address flysheet. Please print carefully, especially where case or numerals are critical.
- Please submit separate forms for For Sale and Wanted items, and be sure to include your name, address and telephone number (including STD code) if you do not use the flysheet.
- Eight lines (forty words) per issue free to all WIA members, ninth and tenth lines for name and address. Commercial rates apply for non-members.
- Deceased estates Hamads will be published in full, even if the ad is not fully radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising (Trade Hamads) are pre-payable at \$25.00 for four lines (twenty words), plus \$2.25 per line (or part thereof), with a minimum charge of \$25.00. Cheques are to be made out to: WIA Hamads.
- Copy should be typed or in block letters, and be received by the deadlines shown on page 1 of each issue of Amateur Radio, at:

Email: [newsletters@ozemail.com.au](mailto:newsletters@ozemail.com.au) Fax: 03 9756 7031

Postal: Newsletters Unlimited, PO Box 431, Monbulk Vic 3793

Please send your Hamad by ONE method only (email preferred)

## FOR SALE ACT

- SIEMENS HF & LF communications receiver. Model 745E. Ranges 1.5 - 30 MHz and 255 - 525 kHz. Including Morse Code printer Model S-11 Schriber F, plus spare parts and valves. Inquiries: Max Phone 02 6292 6327 or Peter VK1CPK Phone 02 6231 1790

## WANTED ACT/NSW

- TOWER, crankup, tilt over. In good condition, will dismantle if required. Contact John VK2JUB Phone 0408 994 955, QTR Phone 02 6284 2742 [johnb2@bigpond.com](mailto:johnb2@bigpond.com)

## FOR SALE NSW

- JRC NRD 545 RECEIVER. Keen SWL now has an amateur license, and has bought a Kenwood TS 2000. Unfortunately, negotiations with XYL have not been totally successful, and the NRD 545 has to go. This is a great receiver, fully digital IF, great sensitivity, selectivity and dynamic range. Synchronous detection is wonderful for reception of SW stations in difficult conditions. Continuously variable bandwidth, passband shift, notch, digital noise reduction, etc. Original packaging and bits and pieces. Better HF receiver than in the TS 2000. Help me get out of purgatory before Wyong 2002! 2 years old, immaculate condition. Currently retails at around \$3700. Yours for \$2,200. Chris, VK2XCD [cdevery@goulburn.net.au](mailto:cdevery@goulburn.net.au)

- DUAL TRACE OSCILLOSCOPE "KIKUSUI" model COS 5020 20MHz exec cond. \$350. KENWOOD TS-440S TRANSCEIVER sn 7060271 \$750. VK2EHZ Phone (02) 6655 0893 email [bedwell@midcoast.com.au](mailto:bedwell@midcoast.com.au)

- GELESO: tuning dial scale, lens and escutcheon only, showing 10 through 80m frequencies, bandspread. As new. COMMAND SCR-274N: Rxs, txs, modulators, racks, mounts, remotes, some complete setups as used in WWII operations. Brian, VK2GCE, Phone 02 9545 2650 or [preferred] [brianclarke@telstra.easymail.com.au](mailto:brianclarke@telstra.easymail.com.au)

## WANTED NSW

- TRANSCEIVER high frequency, valve or solid state, working or not, by pensioner wanting to become active again on air. Anything considered. Must be inexpensive. Please contact Norm VK2ZG QTHR Phone 02 4965 7923 or [normvk2zg@optusnet.com.au](mailto:normvk2zg@optusnet.com.au)

- Two MOTOROLA MIXERS IC1496/1596 or Fairchild 796HC to complete a project begun 25 years ago. Vince VK2ALZ, QTHR. Phone 02 6947 2198

- Hi MOUND PADDOLE, not lamber, Ray VK2FW, QTHR. Phone 02 6365 3410

- MOTOROLA MX-300 BATTERY CHARGER and accessories. RACAL MODULATION METER 409 documentation - maintenance and operation. ARC-5 12-pin CONNECTOR for Tx rack to modulator. Brian, VK2GCE. Phone 02 9545 2650 or [preferred] [brianclarke@telstra.easymail.com.au](mailto:brianclarke@telstra.easymail.com.au)

- Fabric for wv2 U.S.A. Navy Life Boat TX Box Kite. B Clarke VK2ZCQ

## FOR SALE VIC

- FT 767-GX all-mode, all-band TRANSCEIVER, serial no 8L200533 \$2000, exc cond. Licensed amateurs only. Ike Smit VK3CVD. Phone 03 5234 6115

- ICOM IC-T81A HANDHELD, current model, 4 band, 6.2-70-23. Has desktop charger model BC119, case, speaker mic, spare batt, quad band gain antenna. In mint condition hardly used. You can pay \$1375.00 for a new one, or you can buy mine for \$600.00 S/N of Radio is 01029. VK3GV. QTHR or Phone 03 9560 3773. or [valentine@unite.com.au](mailto:valentine@unite.com.au)

- YAESU FL2100Z LINEAR AMPLIFIER S/N 010346, with MANUAL VGC. \$600. Contact Rex VK3MMV. Phone (03) 5978 7177 or email: [jandrg@alphalink.com.au](mailto:jandrg@alphalink.com.au)

- VALVE TESTER TAYLOR Model 45C with handbook and valve data. \$130. COMMS RECEIVER LAFAYETTE HA 600A, 150 kHz - 30 MHz, fully solid state, 12 VDC operation with

TX/RX switching. \$90. Terry VK3ZXY QTHR. Phone 03 9592 1344 email [vk3zxy@leithy.com](mailto:vk3zxy@leithy.com)

## WANTED VIC

- Manual and/or wiring diagram for a UNIDEN 2020 TRANSCEIVER. Ian VK3JQ QTHR Phone 03 5428 7364 (H) 03 9338 0344 (W) email [vk3jq@arrl.net](mailto:vk3jq@arrl.net)
- ICOM EX243 ELECTRONIC KEYS for Icom 735 transceiver Kevin VK3HKV. Phone 03 9836 1587

## FOR SALE QLD

- FOR SALE: ICOM IC471H 70cm all mode & IC-16 Satellite I/F \$900; TOPWARD TAG403 AUDIO GENERATOR sine/sq \$80; MICRONA & REACE HF SWR/PWR meters \$25 each; GME GX284 Marine CB and new Antenna \$50. All one. Plus F/G pipe 4m, degaussing coil, Packet sw box, heat gun, CB ant splitter, horn speaker, 4 station intercom, phone extn bell, phone extn lead, 2 pair I/C cable, ceramic giv insulators, fixed and var TC caps, 2 x Reg 13.8v p/s 1.5A & 3A with spkr, H/B tester for hi pwr transistors, ALL OFFERS. Contact Dennis VK4ADY, QTHR. Phone (07) 4639 2369, Packet VK4ADY@VK4WIL.GGRR.QLD.AUS.OZ, Email [dennisa@hypermax.net.au](mailto:dennisa@hypermax.net.au)

- KENWOOD TS180S HF TRANSCEIVER. Analogue & digital VFO. Digital readout. CW filter. 100 watts. \$350. VK4AR, QTHR. Phone 07 3353 1695.

- POWER SUPPLY. Dick Smith Lab Power Supply K3206, variable to 40 volts (-20, 0, +20) 3amps. Adjustable current limit. Volts & current meters. Works well. As new. \$250. VK4AR, QTHR. Phone 07 3353 1695 (AH).

- ATLAS Model 350-XL TRANSCEIVER with power supply, all transistor. 200 watt output. No WARC frequencies. In good working order. Includes manual and schematic diagrams. Reasonable offers invited around the \$500, preferably by email. Address: [rhvett@gympie.big.net.au](mailto:rhvett@gympie.big.net.au) Ron Vette VK4AJV Phone 07 5488 0268

## WANTED QLD

- EDDYSTONE COMMUNICATION RECEIVERS Model nos 880, 880/2, 880/4, also 680, 680X. Ray VK4FH Phone 07 3299 3819, fax 07 3299 3821, PO Box 5263, Daisy Hill QLD 4127.

- COLLINS and HALLICRAFTERS (USA) made radio equipment by avid collector/restorer, not for resale, but to display, use etc, spare parts, accessories, owner's manuals, working or not. Spotters' fee paid on successful purchase. John Abbott [pukapan@yahoo.com](mailto:pukapan@yahoo.com) or VK4SKY, QTHR. Phone 0417 410 503

- FM MODULE for IC551 or IC551D 6 metre transceiver. VK4AR QTHR, Phone 07 3353 1695 (AH).

## FOR SALE SA

- YAESU FT77 HF rig 100 W, WARC, mint condition, original packing etc \$400. SHINWA 1005 RF filter 500W \$25. Ray, VK5AVR, QTHR. Phone 08 8762 2034

- Deceased Estate: KENWOOD TS-180S with operator's manual \$500. FUKNER COMMANDER ROTATOR with control box, power supply and spare rotator \$100 (needs attention). Paul VK5MAP, QTHR. Phone 08 8651 2398



## WANTED SA

- Two metre 70 cm one antenna operation radio. Really good working order. M Gell VK5ZLC QTHR 08 8294 6906 evenings.
- MOTOR for JANOME TL-603A overlocker required for urgent domestic project. VK5RG, QTHR. Phone 08 8379 1889
- BATTERY CHARGER for a MOTOROLA HT-220 (slimline) handheld. Hank, VK5JAZ, Phone 0403 285 940 or vk5jaz@hotmail.com

## MISCELLANEOUS

- THUNDERBIRD 3 ELEMENT ANTENNA (10,15 & 20 m) atop of fixed 32 ft tower. All yours if you dismantle and take away. Also Model BN-86 Balun. Agree if antenna only required. VK5AGX, QTHR. Phone 08 8258 0412
- The WIA QSL Collection (now Federal) requires QSLs. All types welcome, especially rare DX pictorial cards, special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765, tel. (03) 9728 5350

<http://www.hamsearch.com>  
a not-for-profit site that is a search engine for hams

## TRADE ADS

### FOR SALE ELECTRONIC VALVES

If you are looking for valves you can contact, Gamini Liyadipitiya at email: gamini@ee.unsw.edu.au Small negotiated fee — first come first served.

### AMIDON FERROMAGNETIC CORES:

For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please. 14 Boanyo Ave Kiama). [www.cyberelectric.net.au/~rjandusimports](http://www.cyberelectric.net.au/~rjandusimports).

Agencies at: Active Electronics Tas, Truscotts Electronic World, Melbourne and Mildura: Tower Communications, Perth: Haven Electronics, Nowra

## Email your hamad

Then we just cut and paste.  
You proof it, you retain control.

## "Hey, Old Timer..."



If you have been licensed for more than 25 years you are invited to join the

### Radio Amateurs Old Timers Club Australia

or if you have been licensed for less than 25 but more than ten years, you are invited to become an Associate Member of the RAOTC.

In either case a \$2.50 joining fee plus \$8.00 for one year or \$15.00 for two years gets you two interesting OTN Journals a year plus good fellowship.

Write to

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3/237 Bluff Road  
Sandringham VIC 3191

or call Arthur VK3VQ on 03 9598 4262 or Allan VK3AMD on 03 9570 4610, for an application form.

## RADIO OLD TIMERS CLUB OF SA

### Annual Luncheon

Thursday 25th October 2001

Noon for 12.30pm lunch,

Marion Hotel,

Marion Road, Mitchell Park.

Bring Seniors Card. Bus 243 Stop 24.

RSVP Jack VK5HT 82952209,

Ray VK5RK 82715401 or

Ron VK5RV 82966681

## PLEASE BE KIND TO OSCAR

Meet Mr Oscar Goldenboy, our Hamad typist

Oscar is not an expert in your field — he thinks Megahertz is what happens when he stubs his toe on a rock.

To help Oscar, please write your hamad legibly, using both capitals and lower case, and use legitimate abbreviations.

This will reduce the chance of errors being published, which inconveniences everyone.



## Whale Island Expedition

During November this year (2001), a small number of NZART branch 33 members (Rotorua) are to go to Whale Island for a little radio-activity. The dates planned are for the DX expedition 23rd to the 26th of with operations on all HF bands to take place over the weekend NZ local time.

The location of Whale Island is in the Bay of Plenty which is the coastline North East of the centre of the North Island. Whale island is a small island located some 16 km off shore from the

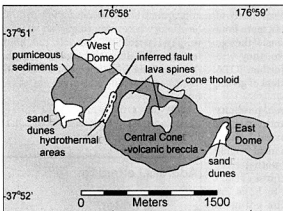
nearest town Whakatane in a nor westerly direction. It should not be confused with the active volcano of White Island a much larger neighbour to the north east

Whale island is presently managed by New Zealand's own Department of Conservation and access to the island is very limited with strict controls for any who may be lucky enough to be allowed a short visit.

Being an island of IOTA interest it is hoped that this expedition will generate

many contacts for the amateurs who will be participating. The special call sign of ZL6WI is being applied from the MED (NZ's Licensing Bureau) and it is hoped that the IOTA committee would give consideration to an unique reference number Details will be released as they come to hand.

Frank May ZL1FMA



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# Hams, exams and tim tams

By Ian Jackson VK3BUF

Recently I was asked to address a group of Scouts who were trying to attain their communications badges. The topic was centred on Amateur operator license types, callsigns, frequency spectrum...you know the sort of stuff. The group was pretty attentive, keen to know the sorts of things that Amateur Radio can provide beyond the Internet and cell phones. One scout, perhaps 13 years old put up his hand and asked 'Wouldn't it be too hard for me to get a license?' A simple question. The reply that surfaced through my mind was 'sorry mate, you're bugged. Unless you want to study electronics each night for a year, or you're already a certified genius, you have as much chance of surviving the ordeal as a Tim Tam in an ant farm.'

Instead I smiled and said: 'Yes I guess it is a bit tricky, but if you try really hard, maybe you could get it one day.'

Now, I am not usually the one to preach doom and gloom...but I will anyway. Amateur radio is rapidly sliding into the sort of oblivion usually reserved for candlestick makers and Zither players. Two things ...no wait... three things have happened simultaneously. Most of the practical outcomes of Amateur Radio operating have been replaced by publicly available methods that need no license. Most of our existing operators are disappearing. (For every four operators who kark it, we would be lucky to get one new starter) Finally, we have shoveled in so much more stuff into the 'Novice' syllabus over the last two decades that it should be renamed 'Engineer-in-waiting'. Now some of you may be thinking, 'Of course we have to make it hard, how else do we keep the riff-raff out?' Which is probably what the Zither Appreciation Society thought as well.

Most of our syllabus is simply obstructionistic. I have taught AOC/P/NAOC/P classes on many occasions, and I am pained to say that there is little in a

twenty-week amateur radio training course that prepares you for what is present under the lid of a modern transceiver. "You see that little black blob in the corner, that's the RF bit." It may not seem like it from the inside, but to other non-amateurs we collectively appear as starchy as a waxed cardboard toilet roll.

'So what do you reckon we ought to be doing, you whining purveyor of human misery?' you may be thinking by now. Well, theories are cheap, so here's a couple.

**Number one.** Make it a bit easier to get on the air, make the 'Novice' certificate live up to its name. The incremental step from No License to Novice license is far too steep. Imagine if the management to Colonial Stadium said: "We invite all interested spectators, but we have no doors into the stadium. You are welcome to scale the walls with ropes and grappling hooks." A bit of imagination quickly yields a few ideas. I would like to see a Regs-only, (no-theory) license that gave access to 70cm for say 18 months. Too easy? How about this: A special Scout license that lets 12 to 16 year olds use 2 metres if they pass the Regs test and are paid up members of the Scout Association. I can think of few groups that would benefit more from reliable field communications. If they go with that for a year or two, they will probably want to take it further. JOTA has always been the equivalent of giving a starving man a tic-tac.

**Number two.** Get some *real* publicity happening. Not that namby-pamby preaching-to-the-converted stuff. Existing Radio Clubs are an ideal vehicle for fresh publicity, with perhaps the W.I.A acting as mission control. (I can't think of a better reason to *have* the Institute) Get promotions going in Secondary schools, four wheel drive clubs, retirement villages etc. Perhaps a few attention grabbing events, like putting a 160m vertical up the Arts

Centre spire or staging a 2m fox hunt through Parliament while it's in session. Install a stylized sculpture of a TH6 at Southbank. What is needed is a continuous barrage of in-your-face public exposure of communications as a hobby.

**Number three.** Simplify our stupid exam and license structure. You'd have to be a Rhodes Scholar to figure out the existing labyrinth of exams vs. classes of license. Why have separate Novice and Full theory exams anyway, the syllabus is mostly the same. Give all the Novice papers the flick and only have the one exam with two pass marks. If your skill is adequate- you get a Novice pass. If you are really good on the day, you get the full ticket. For years I've watched candidates trying to decide whether to sit for the Novice or Full, just missing out on the Full license and walking away with nothing. This brings me to my fourth and last theory (which had better be quick, as Star Trek is about to start).

Make the exams Cheap, Accessible and Spontaneous. This 'one-shot every few months, and then wait another 30 days' is so much tarnished crap. I'm sorry...'*excrement challenged*' is a more appropriate term. We need a few central locations where a candidate can wander in, pay ten dollars, and do a one hour test on a PC. If they are good enough, they go home with a license, calling CQ all the way. If they flunk *let em come back tomorrow*.

Well that's my opinion for today. Please address your hate mail to Lot 1, Princes Highway, Australia.

### Address Letters to:

The Editor,  
Amateur Radio  
34 Hawker Estate  
Elizabeth East SA 5112

- Note 1 Views expressed in letters are those of the authors and do not necessarily represent the policy of the WIA.  
2. Some of the letters may be shortened to allow more letters to be published.

# YAESU SUPER DEAL!



## Yaesu FT-1000MP Mark V Deluxe HF Base Station

Yaesu is proud to enter a new chapter in the history books with the new premier-class MARK-V FT-1000MP. Offering new features such as 200W PEP RF output, a Class-A RF power amplifier, interlocked Digital Bandwidth Tracking, a variable RF front-end preselector filter and improved control layouts, the MARK-V represents the highest overall performance ever offered in a Yaesu HF transceiver.

Whether your interest is in ragchewing or contest operation, the MARK-V's outstanding hybrid analogue/DSP receiver IF chain incorporating a new 10 pole Collins SSB filter and the use of Enhanced Digital Signal Processing (EDSP) with improved front panel access provides dramatic improvements in readability under tough conditions. For ease of use, the new MARK-V uses an external FP-29 power supply which can be mounted next to the transceiver, or under your operating desk. Yaesu's IF-based EDSP system provides noise-reduction protocols, audio enhancement with equalisation programs for Tx and Rx use and an automatic notch filter which identifies and eliminates multiple interfering carriers.

The MARK-V FT-1000MP also features selectable receiver front-ends, High-stability Reference Oscillator, an internal high-power auto antenna tuner, two main antenna sockets, selectable tuning steps as small as 0.625Hz, dual-mode noise blankers, 500Hz and 6kHz IF filters, an RS-232C computer interface, plus easy digital mode interfacing. With so many new and improved features, why not ask for a copy of the 8 page colour brochure today to learn more about this amazing new transceiver.

D 3450

**2 Year Warranty**

**\$5990**

**SAVE \$500!**

**YAESU**

On display at selected PowerHouse stores only. Please call for details. All Yaesu products are priced in Australian dollars, and are not stocked in Dick Smith Electronics stores outside Australia.

Offer expires 31/12/2001.

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ELECTRONICS

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# ICOM'S GREAT CHAMPIONS



## IC-756PROII **NEW!**

Sharp & soft IF filter shape · Improved 3rd IMD & wide dynamic range  
 · One-touch record/play · Digital voice memory · Extended 1/4 Tuning  
 step & BPF functions for SSB-D mode · 32-bit floating-point DSP and 24-bit  
 AD/DA converter · SSB/CW synchronous tuning · 4.9-inch color TFT LCD



## IC-718 A compact HF all band transceiver.

A superior performer with simple, straightforward operation with keypad. Optional AF DSP capabilities, including noise reduction & auto notch function. It's versatile, compact & loaded with features.



## IC-910H The new dimension in the VHF/UHF world!

Tri band multimode transceiver · 2M · 100W, 70CM · 75W, (optional 23CM, 10W) · 9600GPS packet operation  
 · Satellite communication · Reverse/normal tracking doppler shift compensation · CIV capability for PC control



## IC-706MKIIG HF · VHF · UHF The amazing evolution of the legendary 706.

Now includes 70cm @ 20W and output power has been increased to 50W on 2m. You get base station performance and features in a mobile rig sized package.



## IC-T81A A remarkably compact tri bander.

VHF/UHF Multiband FM · 2M, 6M, 70CM, 23CM · 124 alphanumeric memory channels · Ni-MH battery  
 Tone squelch · "Joy Stick" operation

**ICOM**  
 Clearly Ahead